

Union Calendar No. 271

111TH CONGRESS
2D SESSION

H. R. 5116

[Report No. 111–478, Part I]

To invest in innovation through research and development, to improve the competitiveness of the United States, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

APRIL 22, 2010

Mr. GORDON of Tennessee introduced the following bill; which was referred to the Committee on Science and Technology, and in addition to the Committee on Education and Labor, for a period to be subsequently determined by the Speaker, in each case for consideration of such provisions as fall within the jurisdiction of the committee concerned

MAY 7, 2010

Additional sponsors: Mr. EHLERS, Mr. LIPINSKI, Mr. CARNAHAN, Ms. EDDIE BERNICE JOHNSON of Texas, Ms. GIFFORDS, Mr. GARAMENDI, Ms. FUDGE, Mr. TONKO, Mr. BAIRD, Mr. WILSON of Ohio, Mr. MAFFEI, Mr. MARKEY of Massachusetts, Mr. ROTHMAN of New Jersey, Mr. INSLEE, Ms. WOOLSEY, Mrs. DAHLKEMPER, Ms. RICHARDSON, Mr. HOLT, Mr. MILLER of North Carolina, Mr. WU, Ms. EDWARDS of Maryland, Mr. COSTELLO, Ms. ESHOO, Mr. PERRIELLO, Ms. KOSMAS, Mr. ALTMIRE, Mr. MITCHELL, Mr. SALAZAR, Mr. BISHOP of Georgia, Mr. MINNICK, Mr. SPACE, Mr. MOORE of Kansas, Mr. ELLSWORTH, Mr. ARCURI, Mr. BARROW, Mr. SHULER, Mr. BOYD, Mr. HOYER, Mr. MCNERNEY, Ms. ZOE LOFGREN of California, Mr. GEORGE MILLER of California, Mr. LUJÁN, Mr. MATHESON, Mr. HINOJOSA, Mr. CHANDLER, Ms. HARMAN, Mr. MORAN of Virginia, Mr. REYES, Mr. MICHAUD, Mr. SCHIFF, Mr. MEEK of Florida, Mr. SCHAUER, Mr. CARNEY, Ms. TSONGAS, Mr. MARSHALL, Mr. YARMUTH, Mr. LANGEVIN, Mr. CAPUANO, Mr. HEINRICH, Ms. PINGREE of Maine, Mr. HILL, Mr. HARE, Mr. DINGELL, Mr. THOMPSON of California, Ms. CHU, Mr. GRAYSON, Mr. KIND, Mr. VAN HOLLEN, Mr. DAVIS of Tennessee, Mr. PETERS, Mr. MURPHY of New York, Ms. CASTOR of Florida, Mrs. HALVORSON, Ms. SHEA-PORTER, Ms. KILROY, Ms. CLARKE, Mr. CLYBURN, Ms. TITUS, Mr. COURTNEY, Mr. HALL of New York, Mr. TIERNEY, Ms. HIRONO, Mr. CONNOLLY of Vir-

ginia, Mr. HOLDEN, Mr. FOSTER, Ms. DELAURO, Mr. MCGOVERN, Mr. PATRICK J. MURPHY of Pennsylvania, Mr. KRATOVIL, Mr. DONNELLY of Indiana, Mr. QUIGLEY, Mrs. BIGGERT, Mr. KLEIN of Florida, Mr. ROSS, Mr. LARSON of Connecticut, Ms. SUTTON, Mr. ELLISON, Mr. DEUTCH, Mr. SCHRADER, Mr. BOCCIERI, and Ms. MARKEY of Colorado

MAY 7, 2010

Reported from the Committee on Science and Technology with an amendment

[Strike out all after the enacting clause and insert the part printed in italic]

[For text of introduced bill, see copy of bill as introduced on April 22, 2010]

MAY 7, 2010

Committee on Education and Labor discharged; committed to the Committee of the Whole House on the State of the Union and ordered to be printed

A BILL

To invest in innovation through research and development,
to improve the competitiveness of the United States,
and for other purposes.

1 *Be it enacted by the Senate and House of Representa-*
 2 *tives of the United States of America in Congress assembled,*

3 **SECTION 1. SHORT TITLE; TABLE OF CONTENTS.**

4 (a) *SHORT TITLE.*—*This Act may be cited as the*
 5 *“America COMPETES Reauthorization Act of 2010”.*

6 (b) *TABLE OF CONTENTS.*—*The table of contents for*
 7 *this Act is as follows:*

Sec. 1. Short title; table of contents.

TITLE I—SCIENCE AND TECHNOLOGY POLICY

Subtitle A—National Nanotechnology Initiative Amendments

Sec. 101. Short title.

Sec. 102. National nanotechnology program amendments.

Sec. 103. Societal dimensions of nanotechnology.

Sec. 104. Technology transfer.

Sec. 105. Research in areas of national importance.

Sec. 106. Nanomanufacturing research.

Sec. 107. Definitions.

Subtitle B—Networking and Information Technology Research and Development

Sec. 111. Short title.

Sec. 112. Program planning and coordination.

Sec. 113. Large-scale research in areas of national importance.

Sec. 114. Cyber-physical systems and information management.

Sec. 115. National Coordination Office.

Sec. 116. Improving networking and information technology education.

Sec. 117. Conforming and technical amendments.

Subtitle C—Other OSTP Provisions

Sec. 121. Federal scientific collections.

Sec. 122. Coordination of manufacturing research and development.

Sec. 123. Interagency public access committee.

Sec. 124. Fulfilling the potential of women in academic science and engineering.

TITLE II—NATIONAL SCIENCE FOUNDATION

Sec. 201. Short title.

Subtitle A—General Provisions

Sec. 211. Definitions.

Sec. 212. Authorization of appropriations.

Sec. 213. National Science Board administrative amendments.

Sec. 214. Broader impacts review criterion.

Sec. 215. National Center for Science and Engineering Statistics.

Sec. 216. Collection of data on demographics of faculty.

Subtitle B—Research and Innovation

Sec. 221. Support for potentially transformative research.

Sec. 222. Facilitating interdisciplinary collaborations for national needs.

Sec. 223. National Science Foundation manufacturing research and education.

Sec. 224. Strengthening institutional research partnerships.

Sec. 225. National Science Board report on mid-scale instrumentation.

Sec. 226. Sense of Congress on overall support for research infrastructure at the Foundation.

Sec. 227. Partnerships for innovation.

Sec. 228. Prize awards.

Subtitle C—STEM Education and Workforce Training

Sec. 241. Graduate student support.

Sec. 242. Postdoctoral fellowship in STEM education research.

Sec. 243. Robert Noyce teacher scholarship program.

Sec. 244. Institutions serving persons with disabilities.

Sec. 245. Institutional integration.

Sec. 246. Postdoctoral research fellowships.

Sec. 247. Broadening participation training and outreach.

Sec. 248. Transforming undergraduate education in STEM.

Sec. 249. 21st century graduate education.

Sec. 250. Undergraduate broadening participation program.

Sec. 251. Grand challenges in education research.

Sec. 252. Research experiences for undergraduates.

Sec. 253. Laboratory science pilot program.

Sec. 254. STEM industry internship programs.

Sec. 255. Tribal colleges and universities program.

TITLE III—STEM EDUCATION

Sec. 301. Coordination of Federal STEM education.

Sec. 302. Advisory committee on STEM education.

Sec. 303. STEM education at the Department of Energy.

Sec. 304. Green energy education.

TITLE IV—NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY

Sec. 401. Short title.

Sec. 402. Authorization of appropriations.

Sec. 403. Under Secretary of Commerce for Standards and Technology.

Sec. 404. Reorganization of NIST laboratories.

Sec. 405. Federal Government standards and conformity assessment coordination.

Sec. 406. Manufacturing extension partnership.

Sec. 407. Bioscience research program.

Sec. 408. Emergency communication and tracking technologies research initiative.

Sec. 409. TIP Advisory Board.

Sec. 410. Underrepresented minorities.

Sec. 411. Cyber security standards and guidelines.

Sec. 412. Definitions.

TITLE V—INNOVATION

- Sec. 501. Office of Innovation and Entrepreneurship.*
Sec. 502. Federal loan guarantees for innovative technologies in manufacturing.
Sec. 503. Regional innovation program.

TITLE VI—DEPARTMENT OF ENERGY

Subtitle A—Office of Science

- Sec. 601. Short title.*
Sec. 602. Definitions.
Sec. 603. Mission of the Office of Science.
Sec. 604. Basic Energy Sciences Program.
Sec. 605. Biological and Environmental Research Program.
Sec. 606. Advanced Scientific Computing Research Program.
Sec. 607. Fusion energy research program.
Sec. 608. High Energy Physics Program.
Sec. 609. Nuclear Physics Program.
Sec. 610. Science Laboratories Infrastructure Program.
Sec. 611. Authorization of appropriations.

Subtitle B—Advanced Research Projects Agency-Energy

- Sec. 621. Short title.*
Sec. 622. ARPA-E amendments.

Subtitle C—Energy Innovation Hubs

- Sec. 631. Short title.*
Sec. 632. Energy Innovation Hubs.

Subtitle D—Cooperative Research and Development Fund

- Sec. 641. Short title.*
Sec. 642. Cooperative research and development fund.

TITLE VII—MISCELLANEOUS

- Sec. 701. Sense of Congress.*
Sec. 702. Persons with disabilities.
Sec. 703. Veterans and service members.

1 **TITLE I—SCIENCE AND**
2 **TECHNOLOGY POLICY**
3 **Subtitle A—National Nanotechnol-**
4 **ogy Initiative Amendments**

5 **SEC. 101. SHORT TITLE.**

6 *This subtitle may be cited as the “National Nanotech-*
7 *nology Initiative Amendments Act of 2010”.*

1 **SEC. 102. NATIONAL NANOTECHNOLOGY PROGRAM AMEND-**
2 **MENTS.**

3 *The 21st Century Nanotechnology Research and Devel-*
4 *opment Act (15 U.S.C. 7501 et seq.) is amended—*

5 *(1) by striking section 2(c)(4) and inserting the*
6 *following new paragraph:*

7 *“(4) develop, within 12 months after the date of*
8 *enactment of the National Nanotechnology Initiative*
9 *Amendments Act of 2010, and update every 3 years*
10 *thereafter, a strategic plan to guide the activities de-*
11 *scribed under subsection (b) that specifies near-term*
12 *and long-term objectives for the Program, the antici-*
13 *ipated time frame for achieving the near-term objec-*
14 *tives, and the metrics to be used for assessing progress*
15 *toward the objectives, and that describes—*

16 *“(A) how the Program will move results out*
17 *of the laboratory and into applications for the*
18 *benefit of society, including through cooperation*
19 *and collaborations with nanotechnology research,*
20 *development, and technology transition initia-*
21 *tives supported by the States;*

22 *“(B) how the Program will encourage and*
23 *support interdisciplinary research and develop-*
24 *ment in nanotechnology; and*

25 *“(C) proposed research in areas of national*
26 *importance in accordance with the requirements*

1 *of section 105 of the National Nanotechnology*
2 *Initiative Amendments Act of 2010;”;*

3 *(2) in section 2—*

4 *(A) in subsection (d)—*

5 *(i) by redesignating paragraphs (1)*
6 *through (5) as paragraphs (2) through (6),*
7 *respectively; and*

8 *(ii) by inserting the following new*
9 *paragraph before paragraph (2), as so re-*
10 *designated by clause (i) of this subpara-*
11 *graph:*

12 *“(1) the Program budget, for the previous fiscal*
13 *year, for each agency that participates in the Pro-*
14 *gram, including a breakout of spending for the devel-*
15 *opment and acquisition of research facilities and in-*
16 *strumentation, for each program component area, and*
17 *for all activities pursuant to subsection (b)(10);”;* and

18 *(B) by inserting at the end the following*
19 *new subsection:*

20 *“(e) STANDARDS SETTING.—The agencies partici-*
21 *pating in the Program shall support the activities of com-*
22 *mittees involved in the development of standards for nano-*
23 *technology and may reimburse the travel costs of scientists*
24 *and engineers who participate in activities of such commit-*
25 *tees.”;*

1 (3) by striking section 3(b) and inserting the fol-
2 lowing new subsection:

3 “(b) *FUNDING.*—(1) *The operation of the National*
4 *Nanotechnology Coordination Office shall be supported by*
5 *funds from each agency participating in the Program. The*
6 *portion of such Office’s total budget provided by each agen-*
7 *cy for each fiscal year shall be in the same proportion as*
8 *the agency’s share of the total budget for the Program for*
9 *the previous fiscal year, as specified in the report required*
10 *under section 2(d)(1).*

11 “(2) *The annual report under section 2(d) shall in-*
12 *clude—*

13 “(A) *a description of the funding required by the*
14 *National Nanotechnology Coordination Office to per-*
15 *form the functions specified under subsection (a) for*
16 *the next fiscal year by category of activity, including*
17 *the funding required to carry out the requirements of*
18 *section 2(b)(10)(D), subsection (d) of this section, and*
19 *section 5;*

20 “(B) *a description of the funding required by*
21 *such Office to perform the functions specified under*
22 *subsection (a) for the current fiscal year by category*
23 *of activity, including the funding required to carry*
24 *out the requirements of subsection (d); and*

1 “(C) the amount of funding provided for such
2 Office for the current fiscal year by each agency par-
3 ticipating in the Program.”;

4 (4) by inserting at the end of section 3 the fol-
5 lowing new subsection:

6 “(d) *PUBLIC INFORMATION.*—(1) *The National Nano-*
7 *technology Coordination Office shall develop and maintain*
8 *a database accessible by the public of projects funded under*
9 *the Environmental, Health, and Safety, the Education and*
10 *Societal Dimensions, and the Nanomanufacturing program*
11 *component areas, or any successor program component*
12 *areas, including a description of each project, its source of*
13 *funding by agency, and its funding history. For the Envi-*
14 *ronmental, Health, and Safety program component area,*
15 *or any successor program component area, projects shall be*
16 *grouped by major objective as defined by the research plan*
17 *required under section 103(b) of the National Nanotechnol-*
18 *ogy Initiative Amendments Act of 2010. For the Education*
19 *and Societal Dimensions program component area, or any*
20 *successor program component area, the projects shall be*
21 *grouped in subcategories of—*

22 “(A) education in formal settings;

23 “(B) education in informal settings;

24 “(C) public outreach; and

25 “(D) ethical, legal, and other societal issues.

1 “(2) *The National Nanotechnology Coordination Office*
2 *shall develop, maintain, and publicize information on*
3 *nanotechnology facilities supported under the Program, and*
4 *may include information on nanotechnology facilities sup-*
5 *ported by the States, that are accessible for use by individ-*
6 *uals from academic institutions and from industry. The in-*
7 *formation shall include at a minimum the terms and condi-*
8 *tions for the use of each facility, a description of the capa-*
9 *bilities of the instruments and equipment available for use*
10 *at the facility, and a description of the technical support*
11 *available to assist users of the facility.”;*

12 (5) *in section 4(a)—*

13 (A) *by striking “or designate”;*

14 (B) *by inserting “as a distinct entity” after*
15 *“Advisory Panel”; and*

16 (C) *by inserting at the end “The Advisory*
17 *Panel shall form a subpanel with membership*
18 *having specific qualifications tailored to enable*
19 *it to carry out the requirements of subsection*
20 *(c)(7).”;*

21 (6) *in section 4(b)—*

22 (A) *by striking “or designated” and “or*
23 *designating”; and*

24 (B) *by adding at the end the following: “At*
25 *least one member of the Advisory Panel shall be*

1 *an individual employed by and representing a*
 2 *minority-serving institution.”;*

3 *(7) by amending section 5 to read as follows:*

4 **“SEC. 5. TRIENNIAL EXTERNAL REVIEW OF THE NATIONAL**
 5 **NANOTECHNOLOGY PROGRAM.**

6 “(a) *IN GENERAL.—The Director of the National*
 7 *Nanotechnology Coordination Office shall enter into an ar-*
 8 *rangement with the National Research Council of the Na-*
 9 *tional Academy of Sciences to conduct a triennial review*
 10 *of the Program. The Director shall ensure that the arrange-*
 11 *ment with the National Research Council is concluded in*
 12 *order to allow sufficient time for the reporting requirements*
 13 *of subsection (b) to be satisfied. Each triennial review shall*
 14 *include an evaluation of the—*

15 “(1) *research priorities and technical content of*
 16 *the Program, including whether the allocation of*
 17 *funding among program component areas, as des-*
 18 *ignated according to section 2(c)(2), is appropriate;*

19 “(2) *effectiveness of the Program’s management*
 20 *and coordination across agencies and disciplines, in-*
 21 *cluding an assessment of the effectiveness of the Na-*
 22 *tional Nanotechnology Coordination Office;*

23 “(3) *Program’s scientific and technological ac-*
 24 *complishments and its success in transferring tech-*
 25 *nology to the private sector; and*

1 “(4) *adequacy of the Program’s activities ad-*
 2 *ressing ethical, legal, environmental, and other ap-*
 3 *propriate societal concerns, including human health*
 4 *concerns.*

5 “(b) *EVALUATION TO BE TRANSMITTED TO CON-*
 6 *GRESS.—The National Research Council shall document the*
 7 *results of each triennial review carried out in accordance*
 8 *with subsection (a) in a report that includes any rec-*
 9 *ommendations for ways to improve the Program’s manage-*
 10 *ment and coordination processes and for changes to the Pro-*
 11 *gram’s objectives, funding priorities, and technical content.*
 12 *Each report shall be submitted to the Director of the Na-*
 13 *tional Nanotechnology Coordination Office, who shall trans-*
 14 *mit it to the Advisory Panel, the Committee on Commerce,*
 15 *Science, and Transportation of the Senate, and the Com-*
 16 *mittee on Science and Technology of the House of Rep-*
 17 *resentatives not later than September 30 of every third year,*
 18 *with the first report due September 30, 2010.*

19 “(c) *FUNDING.—Of the amounts provided in accord-*
 20 *ance with section 3(b)(1), the following amounts shall be*
 21 *available to carry out this section:*

22 “(1) \$500,000 for fiscal year 2010.

23 “(2) \$500,000 for fiscal year 2011.

24 “(3) \$500,000 for fiscal year 2012.”; and

25 (8) in section 10—

1 (A) by amending paragraph (2) to read as
2 *follows:*

3 “(2) NANOTECHNOLOGY.—The term ‘nanotech-
4 nology’ means the science and technology that will en-
5 able one to understand, measure, manipulate, and
6 manufacture at the nanoscale, aimed at creating ma-
7 terials, devices, and systems with fundamentally new
8 properties or functions.”; and

9 (B) by adding at the end the following new
10 paragraph:

11 “(7) NANOSCALE.—The term ‘nanoscale’ means
12 one or more dimensions of between approximately 1
13 and 100 nanometers.”.

14 **SEC. 103. SOCIETAL DIMENSIONS OF NANOTECHNOLOGY.**

15 (a) COORDINATOR FOR SOCIETAL DIMENSIONS OF
16 NANOTECHNOLOGY.—The Director of the Office of Science
17 and Technology Policy shall designate an associate director
18 of the Office of Science and Technology Policy as the Coor-
19 dinator for Societal Dimensions of Nanotechnology. The Co-
20 ordinator shall be responsible for oversight of the coordina-
21 tion, planning, and budget prioritization of activities re-
22 quired by section 2(b)(10) of the 21st Century Nanotechnol-
23 ogy Research and Development Act (15 U.S.C.
24 7501(b)(10)). The Coordinator shall, with the assistance of
25 appropriate senior officials of the agencies funding activi-

1 *ties within the Environmental, Health, and Safety and the*
2 *Education and Societal Dimensions program component*
3 *areas of the Program, or any successor program component*
4 *areas, ensure that the requirements of such section 2(b)(10)*
5 *are satisfied. The responsibilities of the Coordinator shall*
6 *include—*

7 (1) *ensuring that a research plan for the envi-*
8 *ronmental, health, and safety research activities re-*
9 *quired under subsection (b) is developed, updated, and*
10 *implemented and that the plan is responsive to the*
11 *recommendations of the subpanel of the Advisory*
12 *Panel established under section 4(a) of the 21st Cen-*
13 *tury Nanotechnology Research and Development Act*
14 *(15 U.S.C. 7503(a)), as amended by this subtitle;*

15 (2) *encouraging and monitoring the efforts of the*
16 *agencies participating in the Program to allocate the*
17 *level of resources and management attention necessary*
18 *to ensure that the ethical, legal, environmental, and*
19 *other appropriate societal concerns related to nano-*
20 *technology, including human health concerns, are ad-*
21 *dressed under the Program, including the implemen-*
22 *tation of the research plan described in subsection (b);*
23 *and*

24 (3) *encouraging the agencies required to develop*
25 *the research plan under subsection (b) to identify, as-*

1 *sess, and implement suitable mechanisms for the es-*
2 *tablishment of public-private partnerships for support*
3 *of environmental, health, and safety research.*

4 *(b) RESEARCH PLAN.—*

5 *(1) IN GENERAL.—The Coordinator for Societal*
6 *Dimensions of Nanotechnology shall convene and*
7 *chair a panel comprised of representatives from the*
8 *agencies funding research activities under the Envi-*
9 *ronmental, Health, and Safety program component*
10 *area of the Program, or any successor program com-*
11 *ponent area, and from such other agencies as the Co-*
12 *ordinator considers necessary to develop, periodically*
13 *update, and coordinate the implementation of a re-*
14 *search plan for this program component area. In de-*
15 *veloping and updating the plan, the panel convened*
16 *by the Coordinator shall solicit and be responsive to*
17 *recommendations and advice from—*

18 *(A) the subpanel of the Advisory Panel es-*
19 *tablished under section 4(a) of the 21st Century*
20 *Nanotechnology Research and Development Act*
21 *(15 U.S.C. 7503(a)), as amended by this subtitle;*
22 *and*

23 *(B) the agencies responsible for environ-*
24 *mental, health, and safety regulations associated*

1 *with the production, use, and disposal of*
2 *nanoscale materials and products.*

3 (2) *DEVELOPMENT OF STANDARDS.*—*The plan*
4 *required under paragraph (1) shall include a descrip-*
5 *tion of how the Program will help to ensure the devel-*
6 *opment of—*

7 (A) *standards related to nomenclature asso-*
8 *ciated with engineered nanoscale materials;*

9 (B) *engineered nanoscale standard reference*
10 *materials for environmental, health, and safety*
11 *testing; and*

12 (C) *standards related to methods and proce-*
13 *dures for detecting, measuring, monitoring, sam-*
14 *pling, and testing engineered nanoscale mate-*
15 *rials for environmental, health, and safety im-*
16 *pacts.*

17 (3) *COMPONENTS OF PLAN.*—*The plan required*
18 *under paragraph (1) shall, with respect to activities*
19 *described in paragraphs (1) and (2)—*

20 (A) *specify near-term research objectives*
21 *and long-term research objectives;*

22 (B) *specify milestones associated with each*
23 *near-term objective and the estimated time and*
24 *resources required to reach each milestone;*

1 (C) with respect to subparagraphs (A) and
2 (B), describe the role of each agency carrying out
3 or sponsoring research in order to meet the objec-
4 tives specified under subparagraph (A) and to
5 achieve the milestones specified under subpara-
6 graph (B);

7 (D) specify the funding allocated to each
8 major objective of the plan and the source of
9 funding by agency for the current fiscal year;
10 and

11 (E) estimate the funding required for each
12 major objective of the plan and the source of
13 funding by agency for the following 3 fiscal
14 years.

15 (4) TRANSMITTAL TO CONGRESS.—The plan re-
16 quired under paragraph (1) shall be submitted not
17 later than 60 days after the date of enactment of this
18 Act to the Committee on Commerce, Science, and
19 Transportation of the Senate and the Committee on
20 Science and Technology of the House of Representa-
21 tives.

22 (5) UPDATING AND APPENDING TO REPORT.—
23 The plan required under paragraph (1) shall be up-
24 dated annually and appended to the report required
25 under section 2(d) of the 21st Century Nanotechnol-

1 *ogy Research and Development Act (15 U.S.C.*
 2 *7501(d)).*

3 *(c) NANOTECHNOLOGY PARTNERSHIPS.—*

4 *(1) ESTABLISHMENT.—As part of the program*
 5 *authorized by section 9 of the National Science Foun-*
 6 *dation Authorization Act of 2002, the Director of the*
 7 *National Science Foundation shall provide 1 or more*
 8 *grants to establish partnerships as defined by sub-*
 9 *section (a)(2) of that section, except that each such*
 10 *partnership shall include 1 or more businesses en-*
 11 *gaged in the production of nanoscale materials, prod-*
 12 *ucts, or devices. Partnerships established in accord-*
 13 *ance with this subsection shall be designated as*
 14 *“Nanotechnology Education Partnerships”.*

15 *(2) PURPOSE.—Nanotechnology Education Part-*
 16 *nerships shall be designed to recruit and help prepare*
 17 *secondary school students to pursue postsecondary*
 18 *level courses of instruction in nanotechnology. At a*
 19 *minimum, grants shall be used to support—*

20 *(A) professional development activities to*
 21 *enable secondary school teachers to use curricular*
 22 *materials incorporating nanotechnology and to*
 23 *inform teachers about career possibilities for stu-*
 24 *dents in nanotechnology;*

1 (B) enrichment programs for students, in-
 2 cluding access to nanotechnology facilities and
 3 equipment at partner institutions, to increase
 4 their understanding of nanoscale science and
 5 technology and to inform them about career pos-
 6 sibilities in nanotechnology as scientists, engi-
 7 neers, and technicians; and

8 (C) identification of appropriate nanotech-
 9 nology educational materials and incorporation
 10 of nanotechnology into the curriculum for sec-
 11 ondary school students at one or more organiza-
 12 tions participating in a Partnership.

13 (3) *SELECTION.*—Grants under this subsection
 14 shall be awarded in accordance with subsection (b) of
 15 such section 9, except that paragraph (3)(B) of that
 16 subsection shall not apply.

17 (d) *UNDERGRADUATE EDUCATION PROGRAMS.*—

18 (1) *ACTIVITIES SUPPORTED.*—As part of the ac-
 19 tivities included under the Education and Societal
 20 Dimensions program component area, or any suc-
 21 cessor program component area, the Program shall
 22 support efforts to introduce nanoscale science, engi-
 23 neering, and technology into undergraduate science
 24 and engineering education through a variety of inter-

1 *disciplinary approaches. Activities supported may in-*
 2 *clude—*

3 *(A) development of courses of instruction or*
 4 *modules to existing courses;*

5 *(B) faculty professional development; and*

6 *(C) acquisition of equipment and instru-*
 7 *mentation suitable for undergraduate education*
 8 *and research in nanotechnology.*

9 *(2) COURSE, CURRICULUM, AND LABORATORY IM-*
 10 *PROVEMENT AUTHORIZATION.—There are authorized*
 11 *to be appropriated to the Director of the National*
 12 *Science Foundation to carry out activities described*
 13 *in paragraph (1) through the Course, Curriculum,*
 14 *and Laboratory Improvement program from amounts*
 15 *authorized under section 7002(c)(2)(B) of the America*
 16 *COMPETES Act, \$5,000,000 for fiscal year 2010.*

17 *(3) ADVANCED TECHNOLOGY EDUCATION AU-*
 18 *THORIZATION.—There are authorized to be appro-*
 19 *priated to the Director of the National Science Foun-*
 20 *dation to carry out activities described in paragraph*
 21 *(1) through the Advanced Technology Education pro-*
 22 *gram from amounts authorized under section*
 23 *7002(c)(2)(B) of the America COMPETES Act,*
 24 *\$5,000,000 for fiscal year 2010.*

1 (e) *INTERAGENCY WORKING GROUP.*—*The National*
 2 *Science and Technology Council shall establish under the*
 3 *Nanoscale Science, Engineering, and Technology Sub-*
 4 *committee an Education Working Group to coordinate,*
 5 *prioritize, and plan the educational activities supported*
 6 *under the Program.*

7 (f) *SOCIETAL DIMENSIONS IN NANOTECHNOLOGY EDU-*
 8 *CATION ACTIVITIES.*—*Activities supported under the Edu-*
 9 *cation and Societal Dimensions program component area,*
 10 *or any successor program component area, that involve in-*
 11 *formal, precollege, or undergraduate nanotechnology edu-*
 12 *cation shall include education regarding the environmental,*
 13 *health and safety, and other societal aspects of nanotechnol-*
 14 *ogy.*

15 (g) *REMOTE ACCESS TO NANOTECHNOLOGY FACILI-*
 16 *TIES.*—(1) *Agencies supporting nanotechnology research fa-*
 17 *cilities as part of the Program shall require the entities that*
 18 *operate such facilities to allow access via the Internet, and*
 19 *support the costs associated with the provision of such ac-*
 20 *cess, by secondary school students and teachers, to instru-*
 21 *ments and equipment within such facilities for educational*
 22 *purposes. The agencies may waive this requirement for*
 23 *cases when particular facilities would be inappropriate for*
 24 *educational purposes or the costs for providing such access*
 25 *would be prohibitive.*

1 (2) *The agencies identified in paragraph (1) shall re-*
 2 *quire the entities that operate such nanotechnology research*
 3 *facilities to establish and publish procedures, guidelines,*
 4 *and conditions for the submission and approval of applica-*
 5 *tions for the use of the facilities for the purpose identified*
 6 *in paragraph (1) and shall authorize personnel who operate*
 7 *the facilities to provide necessary technical support to stu-*
 8 *dents and teachers.*

9 **SEC. 104. TECHNOLOGY TRANSFER.**

10 (a) *PROTOTYPING.—*

11 (1) *ACCESS TO FACILITIES.—In accordance with*
 12 *section 2(b)(7) of 21st Century Nanotechnology Re-*
 13 *search and Development Act (15 U.S.C. 7501(b)(7)),*
 14 *the agencies supporting nanotechnology research fa-*
 15 *cilities as part of the Program shall provide access to*
 16 *such facilities to companies for the purpose of assist-*
 17 *ing the companies in the development of prototypes of*
 18 *nanoscale products, devices, or processes (or products,*
 19 *devices, or processes enabled by nanotechnology) for*
 20 *determining proof of concept. The agencies shall pub-*
 21 *licize the availability of these facilities and encourage*
 22 *their use by companies as provided for in this section.*

23 (2) *PROCEDURES.—The agencies identified in*
 24 *paragraph (1)—*

1 (A) shall establish and publish procedures,
2 guidelines, and conditions for the submission
3 and approval of applications for use of nanotech-
4 nology facilities;

5 (B) shall publish descriptions of the capa-
6 bilities of facilities available for use under this
7 subsection, including the availability of technical
8 support; and

9 (C) may waive recovery, require full recov-
10 ery, or require partial recovery of the costs asso-
11 ciated with use of the facilities for projects under
12 this subsection.

13 (3) *SELECTION AND CRITERIA.*—In cases when
14 less than full cost recovery is required pursuant to
15 paragraph (2)(C), projects provided access to nano-
16 technology facilities in accordance with this sub-
17 section shall be selected through a competitive, merit-
18 based process, and the criteria for the selection of such
19 projects shall include at a minimum—

20 (A) the readiness of the project for tech-
21 nology demonstration;

22 (B) evidence of a commitment by the appli-
23 cant for further development of the project to full
24 commercialization if the proof of concept is es-
25 tablished by the prototype; and

1 (C) evidence of the potential for further
 2 funding from private sector sources following the
 3 successful demonstration of proof of concept.

4 The agencies may give special consideration in select-
 5 ing projects to applications that are relevant to im-
 6 portant national needs or requirements.

7 (b) *USE OF EXISTING TECHNOLOGY TRANSFER PRO-*
 8 GRAMS.—

9 (1) *PARTICIPATING AGENCIES.*—Each agency
 10 participating in the Program shall—

11 (A) encourage the submission of applica-
 12 tions for support of nanotechnology related
 13 projects to the Small Business Innovation Re-
 14 search Program and the Small Business Tech-
 15 nology Transfer Program administered by such
 16 agencies; and

17 (B) through the National Nanotechnology
 18 Coordination Office and within 6 months after
 19 the date of enactment of this Act, submit to the
 20 Committee on Commerce, Science, and Transpor-
 21 tation of the Senate and the Committee on
 22 Science and Technology of the House of Rep-
 23 resentatives—

24 (i) the plan described in section 2(c)(7)
 25 of the 21st Century Nanotechnology Re-

1 *search and Development Act (15 U.S.C.*
2 *7501(c)(7)); and*

3 *(ii) a report specifying, if the agency*
4 *administers a Small Business Innovation*
5 *Research Program and a Small Business*
6 *Technology Transfer Program—*

7 *(I) the number of proposals re-*
8 *ceived for nanotechnology related*
9 *projects during the current fiscal year*
10 *and the previous 2 fiscal years;*

11 *(II) the number of such proposals*
12 *funded in each year;*

13 *(III) the total number of nano-*
14 *technology related projects funded and*
15 *the amount of funding provided for fis-*
16 *cal year 2004 through fiscal year 2008;*
17 *and*

18 *(IV) a description of the projects*
19 *identified in accordance with subclause*
20 *(III) which received private sector*
21 *funding beyond the period of phase II*
22 *support.*

23 *(2) NATIONAL INSTITUTE OF STANDARDS AND*
24 *TECHNOLOGY.—The Director of the National Institute*
25 *of Standards and Technology in carrying out the re-*

1 *quirements of section 28 of the National Institute of*
 2 *Standards and Technology Act (15 U.S.C. 278n)*
 3 *shall—*

4 *(A) in regard to subsection (d) of that sec-*
 5 *tion, encourage the submission of proposals for*
 6 *support of nanotechnology related projects; and*

7 *(B) in regard to subsection (g) of that sec-*
 8 *tion, include a description of how the require-*
 9 *ment of subparagraph (A) of this paragraph is*
 10 *being met, the number of proposals for nanotech-*
 11 *nology related projects received, the number of*
 12 *such proposals funded, the total number of such*
 13 *projects funded since the beginning of the Tech-*
 14 *nology Innovation Program, and the outcomes of*
 15 *such funded projects in terms of the metrics de-*
 16 *veloped in accordance with such subsection (g).*

17 *(3) TIP ADVISORY BOARD.—The TIP Advisory*
 18 *Board established under section 28(k) of the National*
 19 *Institute of Standards and Technology Act (15 U.S.C.*
 20 *278n(k)), in carrying out its responsibilities under*
 21 *subsection (k)(3), shall provide the Director of the Na-*
 22 *tional Institute of Standards and Technology with—*

23 *(A) advice on how to accomplish the re-*
 24 *quirement of paragraph (2)(A) of this subsection;*
 25 *and*

1 (B) an assessment of the adequacy of the al-
 2 location of resources for nanotechnology related
 3 projects supported under the Technology Innova-
 4 tion Program.

5 (c) *INDUSTRY LIAISON GROUPS.*—An objective of the
 6 Program shall be to establish industry liaison groups for
 7 all industry sectors that would benefit from applications of
 8 nanotechnology. The Nanomanufacturing, Industry Liai-
 9 son, and Innovation Working Group of the National Science
 10 and Technology Council shall actively pursue establishing
 11 such liaison groups.

12 (d) *COORDINATION WITH STATE INITIATIVES.*—Sec-
 13 tion 2(b)(5) of the 21st Century Nanotechnology Research
 14 and Development Act (15 U.S.C. 7501(b)(5)) is amended
 15 to read as follows:

16 “(5) ensuring United States global leadership in
 17 the development and application of nanotechnology,
 18 including through coordination and leveraging Fed-
 19 eral investments with nanotechnology research, devel-
 20 opment, and technology transition initiatives sup-
 21 ported by the States;”.

22 **SEC. 105. RESEARCH IN AREAS OF NATIONAL IMPORTANCE.**

23 (a) *IN GENERAL.*—The Program shall include support
 24 for nanotechnology research and development activities di-
 25 rected toward application areas that have the potential for

1 *significant contributions to national economic competitive-*
 2 *ness and for other significant societal benefits. The activities*
 3 *supported shall be designed to advance the development of*
 4 *research discoveries by demonstrating technical solutions to*
 5 *important problems in such areas as nano-electronics, en-*
 6 *ergy efficiency, health care, and water remediation and pu-*
 7 *rification. The Advisory Panel shall make recommendations*
 8 *to the Program for candidate research and development*
 9 *areas for support under this section.*

10 *(b) CHARACTERISTICS.—*

11 *(1) IN GENERAL.—Research and development ac-*
 12 *tivities under this section shall—*

13 *(A) include projects selected on the basis of*
 14 *applications for support through a competitive,*
 15 *merit-based process;*

16 *(B) involve collaborations among research-*
 17 *ers in academic institutions and industry, and*
 18 *may involve nonprofit research institutions and*
 19 *Federal laboratories, as appropriate;*

20 *(C) when possible, leverage Federal invest-*
 21 *ments through collaboration with related State*
 22 *initiatives; and*

23 *(D) include a plan for fostering the transfer*
 24 *of research discoveries and the results of tech-*

1 *nology demonstration activities to industry for*
2 *commercial development.*

3 (2) *PROCEDURES.—Determination of the re-*
4 *quirements for applications under this subsection, re-*
5 *view and selection of applications for support, and*
6 *subsequent funding of projects shall be carried out by*
7 *a collaboration of no fewer than 2 agencies partici-*
8 *pating in the Program. In selecting applications for*
9 *support, the agencies shall give special consideration*
10 *to projects that include cost sharing from non-Federal*
11 *sources.*

12 (3) *INTERDISCIPLINARY RESEARCH CENTERS.—*
13 *Research and development activities under this sec-*
14 *tion may be supported through interdisciplinary*
15 *nanotechnology research centers, as authorized by sec-*
16 *tion 2(b)(4) of the 21st Century Nanotechnology Re-*
17 *search and Development Act (15 U.S.C. 7501(b)(4)),*
18 *that are organized to investigate basic research ques-*
19 *tions and carry out technology demonstration activi-*
20 *ties in areas such as those identified in subsection (a).*

21 (c) *REPORT.—Reports required under section 2(d) of*
22 *the 21st Century Nanotechnology Research and Develop-*
23 *ment Act (15 U.S.C. 7501(d)) shall include a description*
24 *of research and development areas supported in accordance*
25 *with this section, including the same budget information*

1 *as is required for program component areas under para-*
 2 *graphs (1) and (2) of such section 2(d).*

3 **SEC. 106. NANOMANUFACTURING RESEARCH.**

4 *(a) RESEARCH AREAS.—The Nanomanufacturing pro-*
 5 *gram component area, or any successor program component*
 6 *area, shall include research on—*

7 *(1) development of instrumentation and tools re-*
 8 *quired for the rapid characterization of nanoscale*
 9 *materials and for monitoring of nanoscale manufac-*
 10 *turing processes; and*

11 *(2) approaches and techniques for scaling the*
 12 *synthesis of new nanoscale materials to achieve indus-*
 13 *trial-level production rates.*

14 *(b) GREEN NANOTECHNOLOGY.—Interdisciplinary re-*
 15 *search centers supported under the Program in accordance*
 16 *with section 2(b)(4) of the 21st Century Nanotechnology Re-*
 17 *search and Development Act (15 U.S.C. 7501(b)(4)) that*
 18 *are focused on nanomanufacturing research and centers es-*
 19 *tablished under the authority of section 105(b)(3) of this*
 20 *subtitle shall include as part of the activities of such cen-*
 21 *ters—*

22 *(1) research on methods and approaches to de-*
 23 *velop environmentally benign nanoscale products and*
 24 *nanoscale manufacturing processes, taking into con-*
 25 *sideration relevant findings and results of research*

supported under the Environmental, Health, and Safety program component area, or any successor program component area;

(2) fostering the transfer of the results of such research to industry; and

(3) providing for the education of scientists and engineers through interdisciplinary studies in the principles and techniques for the design and development of environmentally benign nanoscale products and processes.

(c) REVIEW OF NANOMANUFACTURING RESEARCH AND RESEARCH FACILITIES.—

(1) PUBLIC MEETING.—Not later than 12 months after the date of enactment of this Act, the National Nanotechnology Coordination Office shall sponsor a public meeting, including representation from a wide range of industries engaged in nanoscale manufacturing, to—

(A) obtain the views of participants at the meeting on—

(i) the relevance and value of the research being carried out under the Nanomanufacturing program component area of the Program, or any successor program component area; and

1 (ii) *whether the capabilities of nano-*
2 *technology research facilities supported*
3 *under the Program are adequate—*

4 (I) *to meet current and near-term*
5 *requirements for the fabrication and*
6 *characterization of nanoscale devices*
7 *and systems; and*

8 (II) *to provide access to and use*
9 *of instrumentation and equipment at*
10 *the facilities, by means of networking*
11 *technology, to individuals who are at*
12 *locations remote from the facilities;*
13 *and*

14 (B) *receive any recommendations on ways*
15 *to strengthen the research portfolio supported*
16 *under the Nanomanufacturing program compo-*
17 *nent area, or any successor program component*
18 *area, and on improving the capabilities of nano-*
19 *technology research facilities supported under the*
20 *Program.*

21 *Companies participating in industry liaison groups*
22 *shall be invited to participate in the meeting. The Co-*
23 *ordination Office shall prepare a report documenting*
24 *the findings and recommendations resulting from the*
25 *meeting.*

1 (2) *ADVISORY PANEL REVIEW.*—*The Advisory*
2 *Panel shall review the Nanomanufacturing program*
3 *component area of the Program, or any successor pro-*
4 *gram component area, and the capabilities of nano-*
5 *technology research facilities supported under the Pro-*
6 *gram to assess—*

7 *(A) whether the funding for the Nanomanu-*
8 *facturing program component area, or any suc-*
9 *cessor program component area, is adequate and*
10 *receiving appropriate priority within the overall*
11 *resources available for the Program;*

12 *(B) the relevance of the research being sup-*
13 *ported to the identified needs and requirements*
14 *of industry;*

15 *(C) whether the capabilities of nanotechnol-*
16 *ogy research facilities supported under the Pro-*
17 *gram are adequate—*

18 *(i) to meet current and near-term re-*
19 *quirements for the fabrication and charac-*
20 *terization of nanoscale devices and systems;*
21 *and*

22 *(ii) to provide access to and use of in-*
23 *strumentation and equipment at the facili-*
24 *ties, by means of networking technology, to*

1 *individuals who are at locations remote*
2 *from the facilities; and*

3 *(D) the level of funding that would be need-*
4 *ed to support—*

5 *(i) the acquisition of instrumentation,*
6 *equipment, and networking technology suffi-*
7 *cient to provide the capabilities at nano-*
8 *technology research facilities described in*
9 *subparagraph (C); and*

10 *(ii) the operation and maintenance of*
11 *such facilities.*

12 *In carrying out its assessment, the Advisory Panel*
13 *shall take into consideration the findings and rec-*
14 *ommendations from the report required under para-*
15 *graph (1).*

16 *(3) REPORT.—Not later than 18 months after the*
17 *date of enactment of this Act, the Advisory Panel*
18 *shall submit to the Committee on Commerce, Science,*
19 *and Transportation of the Senate and the Committee*
20 *on Science and Technology of the House of Represent-*
21 *atives a report on its assessment required under para-*
22 *graph (2), along with any recommendations and a*
23 *copy of the report prepared in accordance with para-*
24 *graph (1).*

1 **SEC. 107. DEFINITIONS.**

2 *In this subtitle, terms that are defined in section 10*
 3 *of the 21st Century Nanotechnology Research and Develop-*
 4 *ment Act (15 U.S.C. 7509) have the meaning given those*
 5 *terms in that section.*

6 **Subtitle B—Networking and Infor-**
 7 **mation Technology Research**
 8 **and Development**

9 **SEC. 111. SHORT TITLE.**

10 *This subtitle may be cited as the “Networking and In-*
 11 *formation Technology Research and Development Act of*
 12 *2010”.*

13 **SEC. 112. PROGRAM PLANNING AND COORDINATION.**

14 *(a) PERIODIC REVIEWS.—Section 101 of the High-*
 15 *Performance Computing Act of 1991 (15 U.S.C. 5511) is*
 16 *amended by adding at the end the following new subsection:*

17 *“(d) PERIODIC REVIEWS.—The agencies identified in*
 18 *subsection (a)(3)(B) shall—*

19 *“(1) periodically assess the contents and funding*
 20 *levels of the Program Component Areas and restruc-*
 21 *ture the Program when warranted, taking into con-*
 22 *sideration any relevant recommendations of the advi-*
 23 *sory committee established under subsection (b); and*

24 *“(2) ensure that the Program includes large-*
 25 *scale, long-term, interdisciplinary research and devel-*

1 *opment activities, including activities described in*
 2 *section 104.”.*

3 *(b) DEVELOPMENT OF STRATEGIC PLAN.—Section 101*
 4 *of such Act (15 U.S.C. 5511) is amended further by adding*
 5 *after subsection (d), as added by subsection (a) of this sec-*
 6 *tion, the following new subsection:*

7 *“(e) STRATEGIC PLAN.—*

8 *“(1) IN GENERAL.—The agencies identified in*
 9 *subsection (a)(3)(B), working through the National*
 10 *Science and Technology Council and with the assist-*
 11 *ance of the National Coordination Office established*
 12 *under section 102, shall develop, within 12 months*
 13 *after the date of enactment of the Networking and In-*
 14 *formation Technology Research and Development Act*
 15 *of 2010, and update every 3 years thereafter, a 5-year*
 16 *strategic plan to guide the activities described under*
 17 *subsection (a)(1).*

18 *“(2) CONTENTS.—The strategic plan shall speci-*
 19 *fy near-term and long-term objectives for the Pro-*
 20 *gram, the anticipated time frame for achieving the*
 21 *near-term objectives, the metrics to be used for assess-*
 22 *ing progress toward the objectives, and how the Pro-*
 23 *gram will—*

24 *“(A) foster the transfer of research and de-*
 25 *velopment results into new technologies and ap-*

1 *plications for the benefit of society, including*
2 *through cooperation and collaborations with net-*
3 *working and information technology research,*
4 *development, and technology transition initia-*
5 *tives supported by the States;*

6 *“(B) encourage and support mechanisms for*
7 *interdisciplinary research and development in*
8 *networking and information technology, includ-*
9 *ing through collaborations across agencies, across*
10 *Program Component Areas, with industry, with*
11 *Federal laboratories (as defined in section 4 of*
12 *the Stevenson-Wydler Technology Innovation Act*
13 *of 1980 (15 U.S.C. 3703)), and with inter-*
14 *national organizations;*

15 *“(C) address long-term challenges of na-*
16 *tional importance for which solutions require*
17 *large-scale, long-term, interdisciplinary research*
18 *and development;*

19 *“(D) place emphasis on innovative and*
20 *high-risk projects having the potential for sub-*
21 *stantial societal returns on the research invest-*
22 *ment;*

23 *“(E) strengthen all levels of networking and*
24 *information technology education and training*

1 *programs to ensure an adequate, well-trained*
2 *workforce; and*

3 “(F) *attract more women and underrep-*
4 *resented minorities to pursue postsecondary de-*
5 *grees in networking and information technology.*

6 “(3) *NATIONAL RESEARCH INFRASTRUCTURE.—The*
7 *strategic plan developed in accordance with paragraph (1)*
8 *shall be accompanied by milestones and roadmaps for estab-*
9 *lishing and maintaining the national research infrastruc-*
10 *ture required to support the Program, including the road-*
11 *map required by subsection (a)(2)(E).*

12 “(4) *RECOMMENDATIONS.—The entities involved in*
13 *developing the strategic plan under paragraph (1) shall*
14 *take into consideration the recommendations—*

15 “(A) *of the advisory committee established under*
16 *subsection (b); and*

17 “(B) *of the stakeholders whose input was solici-*
18 *ted by the National Coordination Office, as required*
19 *under section 102(b)(3).*

20 “(5) *REPORT TO CONGRESS.—The Director of the Na-*
21 *tional Coordination Office shall transmit the strategic plan*
22 *required under paragraph (1) to the advisory committee,*
23 *the Committee on Commerce, Science, and Transportation*
24 *of the Senate, and the Committee on Science and Tech-*
25 *nology of the House of Representatives.”.*

1 (c) *ADDITIONAL RESPONSIBILITIES OF DIRECTOR.*—
 2 Section 101(a)(2) of such Act (15 U.S.C. 5511(a)(2)) is
 3 amended—

4 (1) by redesignating subparagraphs (E) and (F)
 5 as subparagraphs (F) and (G), respectively; and

6 (2) by inserting after subparagraph (D) the fol-
 7 lowing new subparagraph:

8 “(E) encourage and monitor the efforts of
 9 the agencies participating in the Program to al-
 10 locate the level of resources and management at-
 11 tention necessary to ensure that the strategic
 12 plan under subsection (e) is developed and exe-
 13 cuted effectively and that the objectives of the
 14 Program are met;”.

15 (d) *ADVISORY COMMITTEE.*—Section 101(b)(1) of such
 16 Act (15 U.S.C. 5511(b)(1)) is amended by inserting after
 17 “an advisory committee on high-performance computing,”
 18 the following: “in which the co-chairs shall be members of
 19 the President’s Council of Advisors on Science and Tech-
 20 nology and with the remainder of the committee”.

21 (e) *REPORT.*—Section 101(a)(3) of such Act (15 U.S.C.
 22 5511(a)(3)) is amended—

23 (1) in subparagraph (C)—

1 (A) by striking “is submitted,” and insert-
 2 ing “is submitted, the levels for the previous fis-
 3 cal year,”; and

4 (B) by striking “each Program Component
 5 Area,” and inserting “each Program Component
 6 Area and research area supported in accordance
 7 with section 104;”;

8 (2) in subparagraph (D)—

9 (A) by striking “each Program Component
 10 Area,” and inserting “each Program Component
 11 Area and research area supported in accordance
 12 with section 104;”;

13 (B) by striking “is submitted,” and insert-
 14 ing “is submitted, the levels for the previous fis-
 15 cal year,”; and

16 (C) by striking “and” after the semicolon;

17 (3) by redesignating subparagraph (E) as sub-
 18 paragraph (G); and

19 (4) by inserting after subparagraph (D) the fol-
 20 lowing new subparagraphs:

21 “(E) include a description of how the objec-
 22 tives for each Program Component Area, and the
 23 objectives for activities that involve multiple Pro-
 24 gram Component Areas, relate to the objectives of

the Program identified in the strategic plan required under subsection (e);

“(F) include—

“(i) a description of the funding required by the National Coordination Office to perform the functions specified under section 102(b) for the next fiscal year by category of activity;

“(ii) a description of the funding required by such Office to perform the functions specified under section 102(b) for the current fiscal year by category of activity; and

“(iii) the amount of funding provided for such Office for the current fiscal year by each agency participating in the Program; and”.

(f) *DEFINITION.*—Section 4 of such Act (15 U.S.C.

5503) is amended—

(1) by redesignating paragraphs (1) through (7) as paragraphs (2) through (8), respectively;

(2) by inserting before paragraph (2), as so redesignated, the following new paragraph:

“(1) ‘cyber-physical systems’ means physical or engineered systems whose networking and information

1 *technology functions and physical elements are deeply*
 2 *integrated and are actively connected to the physical*
 3 *world through sensors, actuators, or other means to*
 4 *perform monitoring and control functions;”;*

5 *(3) in paragraph (4), as so redesignated—*

6 *(A) by striking “high-performance com-*
 7 *puting” and inserting “networking and informa-*
 8 *tion technology”; and*

9 *(B) by striking “supercomputer” and in-*
 10 *serting “high-end computing”;*

11 *(4) in paragraph (6), as so redesignated, by*
 12 *striking “network referred to as” and all that follows*
 13 *through the semicolon and inserting “network, includ-*
 14 *ing advanced computer networks of Federal agencies*
 15 *and departments;”; and*

16 *(5) in paragraph (7), as so redesignated, by*
 17 *striking “National High-Performance Computing*
 18 *Program” and inserting “networking and informa-*
 19 *tion technology research and development program”.*

20 **SEC. 113. LARGE-SCALE RESEARCH IN AREAS OF NATIONAL**
 21 **IMPORTANCE.**

22 *Title I of such Act (15 U.S.C. 5511) is amended by*
 23 *adding at the end the following new section:*

1 **“SEC. 104. LARGE-SCALE RESEARCH IN AREAS OF NA-**
2 **TIONAL IMPORTANCE.**

3 “(a) *IN GENERAL.*—*The Program shall encourage*
4 *agencies identified in section 101(a)(3)(B) to support large-*
5 *scale, long-term, interdisciplinary research and develop-*
6 *ment activities in networking and information technology*
7 *directed toward application areas that have the potential*
8 *for significant contributions to national economic competi-*
9 *tiveness and for other significant societal benefits. Such ac-*
10 *tivities, ranging from basic research to the demonstration*
11 *of technical solutions, shall be designed to advance the devel-*
12 *opment of research discoveries. The advisory committee es-*
13 *tablished under section 101(b) shall make recommendations*
14 *to the Program for candidate research and development*
15 *areas for support under this section.*

16 “(b) *CHARACTERISTICS.*—

17 “(1) *IN GENERAL.*—*Research and development*
18 *activities under this section shall—*

19 “(A) *include projects selected on the basis of*
20 *applications for support through a competitive,*
21 *merit-based process;*

22 “(B) *involve collaborations among research-*
23 *ers in institutions of higher education and in-*
24 *dustry, and may involve nonprofit research in-*
25 *stitutions and Federal laboratories, as appro-*
26 *priate;*

1 “(C) *when possible, leverage Federal invest-*
2 *ments through collaboration with related State*
3 *initiatives; and*

4 “(D) *include a plan for fostering the trans-*
5 *fer of research discoveries and the results of tech-*
6 *nology demonstration activities, including from*
7 *institutions of higher education and Federal lab-*
8 *oratories, to industry for commercial develop-*
9 *ment.*

10 “(2) *COST-SHARING.—In selecting applications*
11 *for support, the agencies shall give special consider-*
12 *ation to projects that include cost sharing from non-*
13 *Federal sources.*

14 “(3) *AGENCY COLLABORATION.—If 2 or more*
15 *agencies identified in section 101(a)(3)(B), or other*
16 *appropriate agencies, are working on large-scale re-*
17 *search and development activities in the same area of*
18 *national importance, then such agencies shall strive*
19 *to collaborate through joint solicitation and selection*
20 *of applications for support and subsequent funding of*
21 *projects.*

22 “(4) *INTERDISCIPLINARY RESEARCH CENTERS.—*
23 *Research and development activities under this sec-*
24 *tion may be supported through interdisciplinary re-*
25 *search centers that are organized to investigate basic*

1 *research questions and carry out technology dem-*
 2 *onstration activities in areas described in subsection*
 3 *(a). Research may be carried out through existing*
 4 *interdisciplinary centers, including those authorized*
 5 *under section 7024(b)(2) of the America COMPETES*
 6 *Act (Public Law 110–69; 42 U.S.C. 1862o–10).”.*

7 **SEC. 114. CYBER-PHYSICAL SYSTEMS AND INFORMATION**
 8 **MANAGEMENT.**

9 *(a) ADDITIONAL PROGRAM CHARACTERISTICS.—Sec-*
 10 *tion 101(a)(1) of such Act (15 U.S.C. 5511(a)(1)) is amend-*
 11 *ed—*

12 *(1) in subparagraph (H), by striking “and”*
 13 *after the semicolon;*

14 *(2) in subparagraph (I), by striking the period*
 15 *at the end and inserting a semicolon; and*

16 *(3) by adding at the end the following new sub-*
 17 *paragraphs:*

18 *“(J) provide for increased understanding of*
 19 *the scientific principles of cyber-physical systems*
 20 *and improve the methods available for the de-*
 21 *sign, development, and operation of cyber-phys-*
 22 *ical systems that are characterized by high reli-*
 23 *ability, safety, and security; and*

1 “(K) provide for research and development
2 on human-computer interactions, visualization,
3 and information management.”.

4 (b) *TASK FORCE*.—Title I of such Act (15 U.S.C.
5 5511) is amended further by adding after section 104, as
6 added by section 113 of this Act, the following new section:

7 **“SEC. 105. UNIVERSITY/INDUSTRY TASK FORCE.**

8 “(a) *ESTABLISHMENT*.—Not later than 180 days after
9 the date of enactment of the Networking and Information
10 Technology Research and Development Act of 2010, the Di-
11 rector of the National Coordination Office established under
12 section 102 shall convene a task force to explore mechanisms
13 for carrying out collaborative research and development ac-
14 tivities for cyber-physical systems, including the related
15 technologies required to enable these systems, through a con-
16 sortium or other appropriate entity with participants from
17 institutions of higher education, Federal laboratories, and
18 industry.

19 “(b) *FUNCTIONS*.—The task force shall—

20 “(1) develop options for a collaborative model
21 and an organizational structure for such entity under
22 which the joint research and development activities
23 could be planned, managed, and conducted effectively,
24 including mechanisms for the allocation of resources

1 *among the participants in such entity for support of*
2 *such activities;*

3 “(2) *propose a process for developing a research*
4 *and development agenda for such entity, including*
5 *objectives and milestones;*

6 “(3) *define the roles and responsibilities for the*
7 *participants from institutions of higher education,*
8 *Federal laboratories, and industry in such entity;*

9 “(4) *propose guidelines for assigning intellectual*
10 *property rights and for the transfer of research results*
11 *to the private sector; and*

12 “(5) *make recommendations for how such entity*
13 *could be funded from Federal, State, and non-govern-*
14 *mental sources.*

15 “(c) *COMPOSITION.—In establishing the task force*
16 *under subsection (a), the Director of the National Coordina-*
17 *tion Office shall appoint an equal number of individuals*
18 *from institutions of higher education and from industry*
19 *with knowledge and expertise in cyber-physical systems, of*
20 *which 2 may be selected from Federal laboratories.*

21 “(d) *REPORT.—Not later than 1 year after the date*
22 *of enactment of the Networking and Information Tech-*
23 *nology Research and Development Act of 2010, the Director*
24 *of the National Coordination Office shall transmit to the*
25 *Committee on Commerce, Science, and Transportation of*

1 *the Senate and the Committee on Science and Technology*
 2 *of the House of Representatives a report describing the find-*
 3 *ings and recommendations of the task force.”.*

4 **SEC. 115. NATIONAL COORDINATION OFFICE.**

5 *Section 102 of such Act (15 U.S.C. 5512) is amended*
 6 *to read as follows:*

7 **“SEC. 102. NATIONAL COORDINATION OFFICE.**

8 *“(a) ESTABLISHMENT.—The Director shall establish a*
 9 *National Coordination Office with a Director and full-time*
 10 *staff.*

11 *“(b) FUNCTIONS.—The National Coordination Office*
 12 *shall—*

13 *“(1) provide technical and administrative sup-*
 14 *port to—*

15 *“(A) the agencies participating in planning*
 16 *and implementing the Program, including such*
 17 *support as needed in the development of the stra-*
 18 *tegic plan under section 101(e); and*

19 *“(B) the advisory committee established*
 20 *under section 101(b);*

21 *“(2) serve as the primary point of contact on*
 22 *Federal networking and information technology ac-*
 23 *tivities for government organizations, academia, in-*
 24 *dustry, professional societies, State computing and*
 25 *networking technology programs, interested citizen*

1 *groups, and others to exchange technical and pro-*
 2 *grammatic information;*

3 *“(3) solicit input and recommendations from a*
 4 *wide range of stakeholders during the development of*
 5 *each strategic plan required under section 101(e)*
 6 *through the convening of at least 1 workshop with*
 7 *invitees from academia, industry, Federal labora-*
 8 *tories, and other relevant organizations and institu-*
 9 *tions;*

10 *“(4) conduct public outreach, including the dis-*
 11 *semination of findings and recommendations of the*
 12 *advisory committee, as appropriate; and*

13 *“(5) promote access to and early application of*
 14 *the technologies, innovations, and expertise derived*
 15 *from Program activities to agency missions and sys-*
 16 *tems across the Federal Government and to United*
 17 *States industry.*

18 *“(c) SOURCE OF FUNDING.—*

19 *“(1) IN GENERAL.—The operation of the Na-*
 20 *tional Coordination Office shall be supported by*
 21 *funds from each agency participating in the Pro-*
 22 *gram.*

23 *“(2) SPECIFICATIONS.—The portion of the total*
 24 *budget of such Office that is provided by each agency*
 25 *for each fiscal year shall be in the same proportion*

1 *as each such agency’s share of the total budget for the*
 2 *Program for the previous fiscal year, as specified in*
 3 *the report required under section 101(a)(3).”.*

4 **SEC. 116. IMPROVING NETWORKING AND INFORMATION**
 5 **TECHNOLOGY EDUCATION.**

6 *Section 201(a) of such Act (15 U.S.C. 5521(a)) is*
 7 *amended—*

8 *(1) by redesignating paragraphs (2) through (4)*
 9 *as paragraphs (3) through (5), respectively; and*

10 *(2) by inserting after paragraph (1) the fol-*
 11 *lowing new paragraph:*

12 *“(2) the National Science Foundation shall use*
 13 *its existing programs, in collaboration with other*
 14 *agencies, as appropriate, to improve the teaching and*
 15 *learning of networking and information technology at*
 16 *all levels of education and to increase participation*
 17 *in networking and information technology fields, in-*
 18 *cluding by women and underrepresented minorities;”.*

19 **SEC. 117. CONFORMING AND TECHNICAL AMENDMENTS.**

20 *(a) SECTION 3.—Section 3 of such Act (15 U.S.C.*
 21 *5502) is amended—*

22 *(1) in the matter preceding paragraph (1), by*
 23 *striking “high-performance computing” and inserting*
 24 *“networking and information technology”;*

1 (2) in paragraph (1), in the matter preceding
 2 subparagraph (A), by striking “high-performance
 3 computing” and inserting “networking and informa-
 4 tion technology”;

5 (3) in subparagraphs (A) and (F) of paragraph
 6 (1), by striking “high-performance computing” each
 7 place it appears and inserting “networking and in-
 8 formation technology”; and

9 (4) in paragraph (2)—

10 (A) by striking “high-performance com-
 11 puting and” and inserting “networking and in-
 12 formation technology and”; and

13 (B) by striking “high-performance com-
 14 puting network” and inserting “networking and
 15 information technology”.

16 (b) *TITLE I.*—The heading of title I of such Act (15
 17 U.S.C. 5511) is amended by striking “**HIGH-PER-**
 18 **FORMANCE COMPUTING**” and inserting “**NET-**
 19 **WORKING AND INFORMATION TECH-**
 20 **NOLOGY**”.

21 (c) *SECTION 101.*—Section 101 of such Act (15 U.S.C.
 22 5511) is amended—

23 (1) in the section heading, by striking “**HIGH-**
 24 **PERFORMANCE COMPUTING**” and inserting

1 **“NETWORKING AND INFORMATION TECH-**
 2 **NOLOGY RESEARCH AND DEVELOPMENT”**;

3 *(2) in subsection (a)—*

4 *(A) in the subsection heading, by striking*
 5 *“NATIONAL HIGH-PERFORMANCE COMPUTING”*
 6 *and inserting “NETWORKING AND INFORMATION*
 7 *TECHNOLOGY RESEARCH AND DEVELOPMENT”*;

8 *(B) in paragraph (1) of such subsection—*

9 *(i) in the matter preceding subpara-*
 10 *graph (A), by striking “National High-Per-*
 11 *formance Computing Program” and insert-*
 12 *ing “networking and information tech-*
 13 *nology research and development program”*;

14 *(ii) in subparagraph (A), by striking*
 15 *“high-performance computing, including*
 16 *networking” and inserting “networking and*
 17 *information technology”*; and

18 *(iii) in subparagraphs (B), (C), and*
 19 *(G), by striking “high-performance” each*
 20 *place it appears and inserting “high-end”*;
 21 *and*

22 *(C) in paragraph (2) of such subsection—*

23 *(i) in subparagraphs (A) and (C)—*

24 *(I) by striking “high-performance*
 25 *computing” each place it appears and*

1 *inserting “networking and information*
 2 *technology”*; and

3 (II) *by striking “development,*
 4 *networking,” each place it appears and*
 5 *inserting “development,”*; and

6 (ii) *in subparagraphs (F) and (G), as*
 7 *redesignated by section 112(c)(1) of this*
 8 *Act, by striking “high-performance” each*
 9 *place it appears and inserting “high-end”*;

10 (3) *in subsection (b)(1), in the matter preceding*
 11 *subparagraph (A), by striking “high-performance*
 12 *computing” both places it appears and inserting*
 13 *“networking and information technology”*; and

14 (4) *in subsection (c)(1)(A), by striking “high-*
 15 *performance computing” and inserting “networking*
 16 *and information technology”*.

17 (d) *SECTION 201.—Section 201(a)(1) of such Act (15*
 18 *U.S.C. 5521(a)(1)) is amended by striking “high-perform-*
 19 *ance computing” and all that follows through “net-*
 20 *working;” and inserting “networking and information re-*
 21 *search and development;”*.

22 (e) *SECTION 202.—Section 202(a) of such Act (15*
 23 *U.S.C. 5522(a)) is amended by striking “high-performance*
 24 *computing” and inserting “networking and information*
 25 *technology”*.

1 (f) *SECTION 203.*—Section 203(a)(1) of such Act (15
 2 U.S.C. 5523(a)(1)) is amended by striking “high-perform-
 3 ance computing and networking” and inserting “net-
 4 working and information technology”.

5 (g) *SECTION 204.*—Section 204(a)(1) of such Act (15
 6 U.S.C. 5524(a)(1)) is amended—

7 (1) in subparagraph (A), by striking “high-per-
 8 formance computing systems and networks” and in-
 9 serting “networking and information technology sys-
 10 tems and capabilities”; and

11 (2) in subparagraph (C), by striking “high-per-
 12 formance computing” and inserting “networking and
 13 information technology”.

14 (h) *SECTION 205.*—Section 205(a) of such Act (15
 15 U.S.C. 5525(a)) is amended by striking “computational”
 16 and inserting “networking and information technology”.

17 (i) *SECTION 206.*—Section 206(a) of such Act (15
 18 U.S.C. 5526(a)) is amended by striking “computational re-
 19 search” and inserting “networking and information tech-
 20 nology research”.

21 (j) *SECTION 208.*—Section 208 of such Act (15 U.S.C.
 22 5528) is amended—

23 (1) in the section heading, by striking “**HIGH-**
 24 **PERFORMANCE COMPUTING**” and inserting

1 **“NETWORKING AND INFORMATION TECH-**
 2 **NOLOGY”**; and

3 (2) in subsection (a)—

4 (A) in paragraph (1), by striking “High-
 5 performance computing and associated” and in-
 6 serting “Networking and information”;

7 (B) in paragraph (2), by striking “high-
 8 performance computing” and inserting “net-
 9 working and information technologies”;

10 (C) in paragraph (4), by striking “high-
 11 performance computers and associated” and in-
 12 serting “networking and information”; and

13 (D) in paragraph (5), by striking “high-
 14 performance computing and associated” and in-
 15 serting “networking and information”.

16 **Subtitle C—Other OSTP Provisions**

17 **SEC. 121. FEDERAL SCIENTIFIC COLLECTIONS.**

18 (a) *MANAGEMENT OF SCIENTIFIC COLLECTIONS.*—The
 19 Office of Science and Technology Policy, in consultation
 20 with relevant Federal agencies, shall ensure the development
 21 of formal policies for the management and use of Federal
 22 scientific collections to improve the quality, organization,
 23 access, including online access, and long-term preservation
 24 of such collections for the benefit of the scientific enterprise.

1 (b) *DEFINITION.*—*For the purposes of this section, the*
 2 *term “scientific collection” means a set of physical speci-*
 3 *mens, living or inanimate, created for the purpose of sup-*
 4 *porting science and serving as a long-term research asset,*
 5 *rather than for their market value as collectibles or their*
 6 *historical, artistic, or cultural significance.*

7 (c) *CLEARINGHOUSE.*—*The Office of Science and Tech-*
 8 *nology Policy, in consultation with relevant Federal agen-*
 9 *cies, shall ensure the development of an online clearinghouse*
 10 *for information on the contents of and access to Federal*
 11 *scientific collections.*

12 (d) *DISPOSAL OF COLLECTIONS.*—*The policies devel-*
 13 *oped under subsection (a) shall—*

14 (1) *require that, before disposing of a scientific*
 15 *collection, a Federal agency shall—*

16 (A) *conduct a review of the research value*
 17 *of the collection; and*

18 (B) *consult with researchers who have used*
 19 *the collection, and other potentially interested*
 20 *parties, concerning—*

21 (i) *the collection’s value for research*
 22 *purposes; and*

23 (ii) *possible additional educational*
 24 *uses for the collection; and*

1 (2) *include procedures for Federal agencies to*
 2 *transfer scientific collections they no longer need to*
 3 *researchers at institutions or other entities qualified*
 4 *to manage the collections.*

5 (e) *COST PROJECTIONS.—The Office of Science and*
 6 *Technology Policy, in consultation with relevant Federal*
 7 *agencies, shall develop a common set of methodologies to be*
 8 *used by Federal agencies for the assessment and projection*
 9 *of costs associated with the management and preservation*
 10 *of their scientific collections.*

11 **SEC. 122. COORDINATION OF MANUFACTURING RESEARCH**
 12 **AND DEVELOPMENT.**

13 (a) *INTERAGENCY COMMITTEE.—The Director of the*
 14 *Office of Science and Technology Policy shall establish or*
 15 *designate an interagency committee under the National*
 16 *Science and Technology Council with the responsibility for*
 17 *planning and coordinating Federal programs and activities*
 18 *in manufacturing research and development.*

19 (b) *RESPONSIBILITIES OF COMMITTEE.—The inter-*
 20 *agency committee established or designated under sub-*
 21 *section (a) shall—*

22 (1) *coordinate the manufacturing research and*
 23 *development programs and activities of the Federal*
 24 *agencies;*

1 (2) *establish goals and priorities for manufac-*
2 *turing research and development that will strengthen*
3 *United States manufacturing; and*

4 (3) *develop and update every 5 years thereafter*
5 *a strategic plan to guide Federal programs and ac-*
6 *tivities in support of manufacturing research and de-*
7 *velopment, which shall—*

8 (A) *specify and prioritize near-term and*
9 *long-term research and development objectives,*
10 *the anticipated time frame for achieving the ob-*
11 *jectives, and the metrics for use in assessing*
12 *progress toward the objectives;*

13 (B) *specify the role of each Federal agency*
14 *in carrying out or sponsoring research and de-*
15 *velopment to meet the objectives of the strategic*
16 *plan; and*

17 (C) *describe how the Federal agencies sup-*
18 *porting manufacturing research and development*
19 *will foster the transfer of research and develop-*
20 *ment results into new manufacturing tech-*
21 *nologies, processes, and products for the benefit of*
22 *society and the national interest.*

23 (c) *RECOMMENDATIONS.—In the development of the*
24 *strategic plan required under subsection (b)(3), the Director*
25 *of the Office of Science and Technology Policy, working*

1 *through the interagency committee, shall take into consider-*
 2 *ation the recommendations of a wide range of stakeholders,*
 3 *including representatives from diverse manufacturing com-*
 4 *panies, academia, and other relevant organizations and in-*
 5 *stitutions.*

6 (d) *REPORT TO CONGRESS.*—Not later than 1 year
 7 after the date of enactment of this Act, the Director of the
 8 Office of Science and Technology Policy shall transmit the
 9 strategic plan developed under subsection (b)(3) to the Com-
 10 mittee on Commerce, Science, and Transportation of the
 11 Senate, and the Committee on Science and Technology of
 12 the House of Representatives, and shall transmit subsequent
 13 updates to those committees when completed.

14 **SEC. 123. INTERAGENCY PUBLIC ACCESS COMMITTEE.**

15 (a) *ESTABLISHMENT.*—The Director of the Office of
 16 Science and Technology Policy shall establish a working
 17 group under the National Science and Technology Council
 18 with the responsibility to coordinate Federal science agency
 19 research and policies related to the dissemination and long-
 20 term stewardship of the results of unclassified research, in-
 21 cluding digital data and peer-reviewed scholarly publica-
 22 tions, supported wholly, or in part, by funding from the
 23 Federal science agencies.

24 (b) *RESPONSIBILITIES.*—The working group estab-
 25 lished under subsection (a) shall—

1 (1) coordinate the development or designation of
2 uniform standards for research data, the structure of
3 full text and metadata, navigation tools, and other
4 applications to achieve interoperability across Federal
5 science agencies, across science and engineering dis-
6 ciplines, and between research data and scholarly
7 publications, taking into account existing consensus
8 standards, including international standards;

9 (2) coordinate Federal science agency programs
10 and activities that support research and education on
11 tools and systems required to ensure preservation and
12 stewardship of all forms of digital research data, in-
13 cluding scholarly publications;

14 (3) work with international science and tech-
15 nology counterparts to maximize interoperability be-
16 tween United States based unclassified research data-
17 bases and international databases and repositories;

18 (4) solicit input and recommendations from, and
19 collaborate with, non-Federal stakeholders, including
20 universities, nonprofit and for-profit publishers, li-
21 braries, federally funded research scientists, and other
22 organizations and institutions with a stake in long
23 term preservation and access to the results of federally
24 funded research; and

1 (5) *establish priorities for coordinating the devel-*
2 *opment of any Federal science agency policies related*
3 *to public access to the results of federally funded re-*
4 *search to maximize uniformity of such policies with*
5 *respect to their benefit to, and potential economic or*
6 *other impact on, the science and engineering enter-*
7 *prise and the stakeholders thereof.*

8 (c) *PATENT OR COPYRIGHT LAW.*—*Nothing in this sec-*
9 *tion shall be construed to affect any right under the provi-*
10 *sions of title 17 or 35, United States Code.*

11 (d) *REPORT TO CONGRESS.*—*Not later than 1 year*
12 *after the date of enactment of this Act, the Director of the*
13 *Office of Science and Technology Policy shall transmit a*
14 *report to Congress describing—*

15 (1) *any priorities established under subsection*
16 *(b)(5);*

17 (2) *the status of any Federal science agency poli-*
18 *cies related to public access to the results of federally*
19 *funded research; and*

20 (3) *how any policies developed or being developed*
21 *by Federal science agencies, as described in para-*
22 *graph (2), incorporate input from the non-Federal*
23 *stakeholders described in subsection (b)(4).*

24 (e) *DEFINITION.*—*For the purposes of this section, the*
25 *term “Federal science agency” means any Federal agency*

1 *with an annual extramural research expenditure of over*
 2 *\$100,000,000.*

3 **SEC. 124. FULFILLING THE POTENTIAL OF WOMEN IN AKA-**
 4 **DEMIC SCIENCE AND ENGINEERING.**

5 (a) *DEFINITION.*—*In this section, the term “Federal*
 6 *science agency” means any Federal agency that is respon-*
 7 *sible for at least 2 percent of total Federal research and*
 8 *development funding to institutions of higher education, ac-*
 9 *cording to the most recent data available from the National*
 10 *Science Foundation.*

11 (b) *WORKSHOPS TO ENHANCE GENDER EQUITY IN*
 12 *ACADEMIC SCIENCE AND ENGINEERING.*—

13 (1) *IN GENERAL.*—*Not later than 6 months after*
 14 *the date of enactment of this Act, the Director of the*
 15 *Office of Science and Technology Policy shall develop*
 16 *a uniform policy for all Federal science agencies to*
 17 *carry out a program of workshops that educate pro-*
 18 *gram officers, members of grant review panels, insti-*
 19 *tution of higher education STEM department chairs,*
 20 *and other federally funded researchers about methods*
 21 *that minimize the effects of gender bias in evaluation*
 22 *of Federal research grants and in the related aca-*
 23 *demic advancement of actual and potential recipients*
 24 *of these grants, including hiring, tenure, promotion,*

1 *and selection for any honor based in part on the re-*
2 *cipient's research record.*

3 (2) *INTERAGENCY COORDINATION.—The Director*
4 *of the Office of Science and Technology Policy shall*
5 *ensure that programs of workshops across the Federal*
6 *science agencies are coordinated and supported jointly*
7 *as appropriate. As part of this process, the Director*
8 *of the Office of Science and Technology Policy shall*
9 *ensure that at least 1 workshop is supported every 2*
10 *years among the Federal science agencies in each of*
11 *the major science and engineering disciplines sup-*
12 *ported by those agencies.*

13 (3) *ORGANIZATIONS ELIGIBLE TO CARRY OUT*
14 *WORKSHOPS.—Federal science agencies may carry out*
15 *the program of workshops under this subsection by*
16 *making grants to eligible organizations. In addition*
17 *to any other organizations made eligible by the Fed-*
18 *eral science agencies, the following organizations are*
19 *eligible for grants under this subsection:*

20 (A) *Nonprofit scientific and professional so-*
21 *cieties and organizations that represent one or*
22 *more STEM disciplines.*

23 (B) *Nonprofit organizations that have the*
24 *primary mission of advancing the participation*
25 *of women in STEM.*

1 (4) *CHARACTERISTICS OF WORKSHOPS.—The*
2 *workshops shall have the following characteristics:*

3 (A) *Invitees to workshops shall include at*
4 *least—*

5 (i) *the chairs of departments in the rel-*
6 *evant discipline from at least the top 50 in-*
7 *stitutions of higher education, as deter-*
8 *mined by the amount of Federal research*
9 *and development funds obligated to each in-*
10 *stitution of higher education in the prior*
11 *year based on data available from the Na-*
12 *tional Science Foundation;*

13 (ii) *members of any standing research*
14 *grant review panel appointed by the Fed-*
15 *eral science agencies in the relevant dis-*
16 *cipline;*

17 (iii) *in the case of science and engi-*
18 *neering disciplines supported by the De-*
19 *partment of Energy, the individuals from*
20 *each of the Department of Energy National*
21 *Laboratories with personnel management*
22 *responsibilities comparable to those of an*
23 *institution of higher education department*
24 *chair; and*

1 (iv) *Federal science agency program*
2 *officers in the relevant discipline, other than*
3 *program officers that participate in com-*
4 *parable workshops organized and run spe-*
5 *cifically for that agency's program officers.*

6 (B) *Activities at the workshops shall include*
7 *research presentations and interactive discus-*
8 *sions or other activities that increase the aware-*
9 *ness of the existence of gender bias in the grant-*
10 *making process and the development of the aca-*
11 *ademic record necessary to qualify as a grant re-*
12 *cipient, including recruitment, hiring, tenure re-*
13 *view, promotion, and other forms of formal rec-*
14 *ognition of individual achievement, and provide*
15 *strategies to overcome such bias.*

16 (C) *Research presentations and other work-*
17 *shop programs, as appropriate, shall include a*
18 *discussion of the unique challenges faced by*
19 *women who are members of historically under-*
20 *represented groups.*

21 (D) *Workshop programs shall include infor-*
22 *mation on best practices and the value of men-*
23 *toring undergraduate and graduate women stu-*
24 *dents as well as outreach to girls earlier in their*
25 *STEM education.*

1 (5) *REPORT.*—

2 (A) *IN GENERAL.*—Not later than 5 years
3 after the date of enactment of this Act, the Direc-
4 tor of the Office of Science and Technology Pol-
5 icy shall transmit to the Committee on Science
6 and Technology of the House of Representatives
7 and the Committee on Commerce, Science, and
8 Transportation of the Senate a report evaluating
9 the effectiveness of the program carried out under
10 this subsection to reduce gender bias towards
11 women engaged in research funded by the Fed-
12 eral Government. The Director of the Office of
13 Science and Technology Policy shall include in
14 this report any recommendations for improving
15 the evaluation process described in subparagraph
16 (B).

17 (B) *MINIMUM CRITERIA FOR EVALUA-*
18 *TION.*—In determining the effectiveness of the
19 program, the Director of the Office of Science
20 and Technology Policy shall consider, at a min-
21 imum—

22 (i) the rates of participation by
23 invitees in the workshops authorized under
24 this subsection;

1 (ii) the results of attitudinal surveys
2 conducted on workshop participants before
3 and after the workshops;

4 (iii) any relevant institutional policy
5 or practice changes reported by partici-
6 pants; and

7 (iv) for individuals described in para-
8 graph (4)(A)(i) or (iii) who participated in
9 at least 1 workshop 3 or more years prior
10 to the due date for the report, trends in the
11 data for the department represented by the
12 chair or employee including faculty data re-
13 lated to gender as described in section 216.

14 (C) INSTITUTIONAL ATTENDANCE AT WORK-
15 SHOPS.—As part of the report under subpara-
16 graph (A), the Director of the Office of Science
17 and Technology Policy shall include a list of in-
18 stitutions of higher education science and engi-
19 neering departments whose representatives at-
20 tended the workshops required under this sub-
21 section.

22 (6) MINIMIZING COSTS.—To the extent prac-
23 ticable, workshops shall be held in conjunction with
24 national or regional disciplinary meetings to mini-
25 mize costs associated with participant travel.

1 (c) *EXTENDED RESEARCH GRANT SUPPORT AND IN-*
 2 *TERIM TECHNICAL SUPPORT FOR CAREGIVERS.*—

3 (1) *POLICIES FOR CAREGIVERS.*—*Not later than*
 4 *6 months after the date of enactment of this Act, the*
 5 *Director of the Office of Science and Technology Pol-*
 6 *icy shall develop a uniform policy to—*

7 (A) *extend the period of grant support for*
 8 *federally funded researchers who have caregiving*
 9 *responsibilities; and*

10 (B) *provide funding for interim technical*
 11 *staff support for federally funded researchers who*
 12 *take a leave of absence for caregiving responsibil-*
 13 *ities.*

14 (2) *REPORT.*—*Upon developing the policy re-*
 15 *quired under paragraph (1), the Director of the Office*
 16 *of Science and Technology Policy shall transmit a*
 17 *copy of the policy to the Committee on Science and*
 18 *Technology of the House of Representatives and to the*
 19 *Committee on Commerce, Science, and Transpor-*
 20 *tation of the Senate.*

21 (d) *COLLECTION OF DATA ON FEDERAL RESEARCH*
 22 *GRANTS.*—

23 (1) *IN GENERAL.*—*Each Federal science agency*
 24 *shall collect standardized annual composite informa-*
 25 *tion on demographics, field, award type and budget*

1 *request, review score, and funding outcome for all ap-*
2 *plications for research and development grants to in-*
3 *stitutions of higher education supported by that agen-*
4 *cy.*

5 (2) *REPORTING OF DATA.—*

6 (A) *The Director of the Office of Science*
7 *and Technology Policy shall establish a policy to*
8 *ensure uniformity and standardization of data*
9 *collection required under paragraph (1).*

10 (B) *Not later than 2 years after the date of*
11 *enactment of this Act, and annually thereafter,*
12 *each Federal science agency shall submit data*
13 *collected under paragraph (1) to the National*
14 *Science Foundation.*

15 (C) *The National Science Foundation shall*
16 *be responsible for storing and publishing all of*
17 *the grant data submitted under subparagraph*
18 *(B) in conjunction with the biennial report re-*
19 *quired under section 37 of the Science and Engi-*
20 *neering Equal Opportunities Act (42 U.S.C.*
21 *1885d).*

1 **TITLE II—NATIONAL SCIENCE**
 2 **FOUNDATION**

3 **SEC. 201. SHORT TITLE.**

4 *This title may be cited as the “National Science Foun-*
 5 *dation Authorization Act of 2010”.*

6 **Subtitle A—General Provisions**

7 **SEC. 211. DEFINITIONS.**

8 *In this title:*

9 (1) *DIRECTOR.*—*The term “Director” means the*
 10 *Director of the National Science Foundation estab-*
 11 *lished under section 2 of the National Science Foun-*
 12 *dation Act of 1950 (42 U.S.C. 1861).*

13 (2) *FOUNDATION.*—*The term “Foundation”*
 14 *means the National Science Foundation established*
 15 *under section 2 of the National Science Foundation*
 16 *Act of 1950 (42 U.S.C. 1861).*

17 (3) *INSTITUTION OF HIGHER EDUCATION.*—*The*
 18 *term “institution of higher education” has the mean-*
 19 *ing given such term in section 101(a) of the Higher*
 20 *Education Act of 1965 (20 U.S.C. 1001(a)).*

21 (4) *STATE.*—*The term “State” means one of the*
 22 *several States, the District of Columbia, the Common-*
 23 *wealth of Puerto Rico, the Virgin Islands, Guam,*
 24 *American Samoa, the Commonwealth of the Northern*

1 *Mariana Islands, or any other territory or possession*
2 *of the United States.*

3 (5) *STEM.*—*The term “STEM” means science,*
4 *technology, engineering, and mathematics.*

5 (6) *UNITED STATES.*—*The term “United States”*
6 *means the several States, the District of Columbia, the*
7 *Commonwealth of Puerto Rico, the Virgin Islands,*
8 *Guam, American Samoa, the Commonwealth of the*
9 *Northern Mariana Islands, and any other territory or*
10 *possession of the United States.*

11 **SEC. 212. AUTHORIZATION OF APPROPRIATIONS.**

12 (a) *FISCAL YEAR 2011.*—

13 (1) *IN GENERAL.*—*There are authorized to be ap-*
14 *propriated to the Foundation \$7,481,000,000 for fis-*
15 *cal year 2011.*

16 (2) *SPECIFIC ALLOCATIONS.*—*Of the amount au-*
17 *thorized under paragraph (1)—*

18 (A) *\$6,020,000,000 shall be made available*
19 *for research and related activities;*

20 (B) *\$945,000,000 shall be made available*
21 *for education and human resources;*

22 (C) *\$166,000,000 shall be made available*
23 *for major research equipment and facilities con-*
24 *struction;*

1 (D) \$330,000,000 shall be made available
2 for agency operations and award management;

3 (E) \$4,840,000 shall be made available for
4 the Office of the National Science Board; and

5 (F) \$14,830,000 shall be made available for
6 the Office of Inspector General.

7 (b) FISCAL YEAR 2012.—

8 (1) IN GENERAL.—There are authorized to be ap-
9 propriated to the Foundation \$8,127,000,000 for fis-
10 cal year 2012.

11 (2) SPECIFIC ALLOCATIONS.—Of the amount au-
12 thorized under paragraph (1)—

13 (A) \$6,496,000,000 shall be made available
14 for research and related activities;

15 (B) \$1,020,000,000 shall be made available
16 for education and human resources;

17 (C) \$235,000,000 shall be made available
18 for major research equipment and facilities con-
19 struction;

20 (D) \$356,000,000 shall be made available
21 for agency operations and award management;

22 (E) \$5,010,000 shall be made available for
23 the Office of the National Science Board; and

24 (F) \$15,350,000 shall be made available for
25 the Office of Inspector General.

1 (c) *FISCAL YEAR 2013.*—

2 (1) *IN GENERAL.*—*There are authorized to be ap-*
3 *propriated to the Foundation \$8,764,000,000 for fis-*
4 *cal year 2013.*

5 (2) *SPECIFIC ALLOCATIONS.*—*Of the amount au-*
6 *thorized under paragraph (1)—*

7 (A) *\$7,009,000,000 shall be made available*
8 *for research and related activities;*

9 (B) *\$1,100,000,000 shall be made available*
10 *for education and human resources;*

11 (C) *\$250,000,000 shall be made available*
12 *for major research equipment and facilities con-*
13 *struction;*

14 (D) *\$384,000,000 shall be made available*
15 *for agency operations and award management;*

16 (E) *\$5,180,000 shall be made available for*
17 *the Office of the National Science Board; and*

18 (F) *\$15,890,000 shall be made available for*
19 *the Office of Inspector General.*

20 (d) *FISCAL YEAR 2014.*—

21 (1) *IN GENERAL.*—*There are authorized to be ap-*
22 *propriated to the Foundation \$9,436,000,000 for fis-*
23 *cal year 2014.*

24 (2) *SPECIFIC ALLOCATIONS.*—*Of the amount au-*
25 *thorized under paragraph (1)—*

1 (A) \$7,562,000,000 shall be made available
2 for research and related activities;

3 (B) \$1,187,000,000 shall be made available
4 for education and human resources;

5 (C) \$250,000,000 shall be made available
6 for major research equipment and facilities con-
7 struction;

8 (D) \$415,000,000 shall be made available
9 for agency operations and award management;

10 (E) \$5,370,000 shall be made available for
11 the Office of the National Science Board; and

12 (F) \$16,440,000 shall be made available for
13 the Office of Inspector General.

14 (e) FISCAL YEAR 2015.—

15 (1) IN GENERAL.—There are authorized to be ap-
16 propriated to the Foundation \$10,161,000,000 for fis-
17 cal year 2015.

18 (2) SPECIFIC ALLOCATIONS.—Of the amount au-
19 thorized under paragraph (1)—

20 (A) \$8,160,000,000 shall be made available
21 for research and related activities;

22 (B) \$1,281,000,000 shall be made available
23 for education and human resources;

1 (C) \$250,000,000 shall be made available
 2 for major research equipment and facilities con-
 3 struction;

4 (D) \$447,000,000 shall be made available
 5 for agency operations and award management;

6 (E) \$5,550,000 shall be made available for
 7 the Office of the National Science Board; and

8 (F) \$17,020,000 shall be made available for
 9 the Office of Inspector General.

10 **SEC. 213. NATIONAL SCIENCE BOARD ADMINISTRATIVE**
 11 **AMENDMENTS.**

12 (a) *STAFFING AT THE NATIONAL SCIENCE BOARD.*—
 13 *Section 4(g) of the National Science Foundation Act of*
 14 *1950 (42 U.S.C. 1863(g)) is amended by striking “not more*
 15 *than 5”.*

16 (b) *SCIENCE AND ENGINEERING INDICATORS DUE*
 17 *DATE.*—*Section 4(j)(1) of the National Science Foundation*
 18 *Act of 1950 (42 U.S.C. 1863(j)(1)) is amended by striking*
 19 *“January 15” and inserting “May 31”.*

20 (c) *NATIONAL SCIENCE BOARD REPORTS.*—*Section*
 21 *4(j)(2) of the National Science Foundation Act of 1950 (42*
 22 *U.S.C. 1863(j)(2)) is amended by inserting “within the au-*
 23 *thority of the Foundation (or otherwise as requested by the*
 24 *appropriate Congressional committees of jurisdiction or the*
 25 *President)” after “individual policy matters”.*

1 (d) *BOARD ADHERENCE TO SUNSHINE ACT.*—Section
 2 15(a) of the National Science Foundation Authorization
 3 Act of 2002 (42 U.S.C. 1862n–5(a)) is amended—

4 (1) by striking paragraph (3) and redesignating
 5 paragraphs (4) and (5) as paragraphs (3) and (4),
 6 respectively;

7 (2) in paragraph (3), as so redesignated by
 8 paragraph (1) of this subsection—

9 (A) by striking “February 15” and insert-
 10 ing “April 15”; and

11 (B) by striking “the audit required under
 12 paragraph (3) along with” and inserting “any”;
 13 and

14 (3) in paragraph (4), as so redesignated by
 15 paragraph (1) of this subsection, by striking “To fa-
 16 cilitate the audit required under paragraph (3) of
 17 this subsection, the” and inserting “The”.

18 **SEC. 214. BROADER IMPACTS REVIEW CRITERION.**

19 (a) *GOALS.*—The Foundation shall apply a Broader
 20 Impacts Review Criterion to achieve the following goals:

21 (1) *Increased economic competitiveness of the*
 22 *United States.*

23 (2) *Development of a globally competitive STEM*
 24 *workforce.*

1 (3) *Increased participation of women and under-*
2 *represented minorities in STEM.*

3 (4) *Increased partnerships between academia*
4 *and industry.*

5 (5) *Improved pre-K-12 STEM education and*
6 *teacher development.*

7 (6) *Improved undergraduate STEM education.*

8 (7) *Increased public scientific literacy.*

9 (8) *Increased national security.*

10 (b) *POLICY.—Not later than 6 months after the date*
11 *of enactment of this Act, the Director shall develop and im-*
12 *plement a policy for the Broader Impacts Review Criterion*
13 *that—*

14 (1) *provides for educating professional staff at*
15 *the Foundation, merit review panels, and applicants*
16 *for Foundation research grants on the policy devel-*
17 *oped under this subsection;*

18 (2) *clarifies that the activities of grant recipients*
19 *undertaken to satisfy the Broader Impacts Review*
20 *Criterion shall—*

21 (A) *to the extent practicable employ proven*
22 *strategies and models and draw on existing pro-*
23 *grams and activities; and*

24 (B) *when novel approaches are justified,*
25 *build on the most current research results;*

1 (3) allows for some portion of funds allocated to
 2 broader impacts under a research grant to be used for
 3 assessment and evaluation of the broader impacts ac-
 4 tivity;

5 (4) encourages institutions of higher education
 6 and other nonprofit education or research organiza-
 7 tions to develop and provide, either as individual in-
 8 stitutions or in partnerships thereof, appropriate
 9 training and programs to assist Foundation-funded
 10 principal investigators at their institutions in achiev-
 11 ing the goals of the Broader Impacts Review Criterion
 12 as described in subsection (a); and

13 (5) requires principal investigators applying for
 14 Foundation research grants to provide evidence of in-
 15 stitutional support for the portion of the investigator's
 16 proposal designed to satisfy the Broader Impacts Re-
 17 view Criterion, including evidence of relevant train-
 18 ing, programs, and other institutional resources
 19 available to the investigator from either their home
 20 institution or organization or another institution or
 21 organization with relevant expertise.

22 **SEC. 215. NATIONAL CENTER FOR SCIENCE AND ENGINEER-**
 23 **ING STATISTICS.**

24 (a) *ESTABLISHMENT.*—There is established within the
 25 Foundation a National Center for Science and Engineering

1 *Statistics (in this section referred to as the “Center”), that*
2 *shall serve as a central Federal clearinghouse for the collec-*
3 *tion, interpretation, analysis, and dissemination of objec-*
4 *tive data on science, engineering, technology, and research*
5 *and development.*

6 (b) *DUTIES.—In carrying out subsection (a) of this*
7 *section, the Director, acting through the Center shall—*

8 (1) *collect, acquire, analyze, report, and dissemi-*
9 *nate statistical data related to the science and engi-*
10 *neering enterprise in the United States and other na-*
11 *tions that is relevant and useful to practitioners, re-*
12 *searchers, policymakers, and the public, including*
13 *statistical data on—*

14 (A) *research and development trends;*

15 (B) *the science and engineering workforce;*

16 (C) *United States competitiveness in*
17 *science, engineering, technology, and research*
18 *and development; and*

19 (D) *the condition and progress of United*
20 *States STEM education;*

21 (2) *support research using the data it collects,*
22 *and on methodologies in areas related to the work of*
23 *the Center; and*

1 (3) support the education and training of re-
 2 searchers in the use of large-scale, nationally rep-
 3 resentative data sets.

4 (c) *STATISTICAL REPORTS.*—The Director or the Na-
 5 tional Science Board, acting through the Center, shall issue
 6 regular, and as necessary, special statistical reports on top-
 7 ics related to the national and international science and
 8 engineering enterprise such as the biennial report required
 9 by section 4 (j)(1) of the National Science Foundation Act
 10 of 1950 (42 U.S.C. 1863(j)(1)) on indicators of the state
 11 of science and engineering in the United States.

12 **SEC. 216. COLLECTION OF DATA ON DEMOGRAPHICS OF**
 13 **FACULTY.**

14 (a) *COLLECTION OF DATA.*—The Director shall report,
 15 in conjunction with the biennial report required under sec-
 16 tion 37 of the Science and Engineering Equal Opportuni-
 17 ties Act (42 U.S.C. 19885d), statistical summary data on
 18 the demographics of STEM discipline faculty at institu-
 19 tions of higher education in the United States. At a min-
 20 imum, the Director shall consider—

21 (1) the number and percent of faculty by gender,
 22 race, and age;

23 (2) the number and percent of faculty at each
 24 rank, by gender, race, and age;

1 (3) *the number and percent of faculty who are*
 2 *in nontenure-track positions, including teaching and*
 3 *research, by gender, race, and age;*

4 (4) *the number of faculty who are reviewed for*
 5 *promotion, including tenure, and the percentage of*
 6 *that number who are promoted, by gender, race, and*
 7 *age;*

8 (5) *faculty years in rank by gender, race, and*
 9 *age;*

10 (6) *faculty attrition by gender, race, and age;*

11 (7) *the number and percent of faculty hired by*
 12 *rank, gender, race, and age; and*

13 (8) *the number and percent of faculty in leader-*
 14 *ship positions, including endowed or named chairs,*
 15 *serving on promotion and tenure committees, by gen-*
 16 *der, race, and age.*

17 (b) *RECOMMENDATIONS.—The Director shall solicit*
 18 *input and recommendations from relevant stakeholders, in-*
 19 *cluding representatives from institutions of higher edu-*
 20 *cation and nonprofit organizations, on the collection of data*
 21 *required under subsection (a), including the development of*
 22 *standard definitions on the terms and categories to be used*
 23 *in the collection of such data.*

24 (c) *REPORT TO CONGRESS.—Not later than 2 years*
 25 *after the date of enactment of this Act, the Director shall*

1 *submit a report to Congress on how the Foundation will*
 2 *gather the demographic data on STEM faculty, including—*
 3 *(1) a description of the data to be reported and*
 4 *the sources of those data;*
 5 *(2) justification for the exclusion of any data de-*
 6 *scribed in paragraph (1); and*
 7 *(3) a list of the definitions for the terms and cat-*
 8 *egories, such as “faculty” and “leadership positions”,*
 9 *to be applied in the reporting of all data described in*
 10 *paragraph (1).*

11 ***Subtitle B—Research and*** 12 ***Innovation***

13 ***SEC. 221. SUPPORT FOR POTENTIALLY TRANSFORMATIVE*** 14 ***RESEARCH.***

15 *(a) POLICY.—The Director shall establish a policy that*
 16 *requires the Foundation to use at least 5 percent of its re-*
 17 *search budget to fund high-risk, high-reward basic research*
 18 *proposals. Support for facilities and infrastructure, includ-*
 19 *ing preconstruction design and operations and mainte-*
 20 *nance of major research facilities, shall not be counted as*
 21 *part of the research budget for the purposes of this section.*

22 *(b) IMPLEMENTATION.—In implementing such policy,*
 23 *the Foundation may—*

24 *(1) develop solicitations specifically for high-risk,*
 25 *high-reward basic research;*

(3) *support workshops and participate in conferences with the primary purpose of identifying new opportunities for high-risk, high-reward basic research, especially at interdisciplinary interfaces.*

(c) *DEFINITION.*—For purposes of this section, the term “high-risk, high-reward basic research” means research driven by ideas that have the potential to radically change our understanding of an important existing scientific or engineering concept, or leading to the creation of a new paradigm or field of science or engineering, and that is characterized by its challenge to current understanding or its pathway to new frontiers.

18 *SEC. 222. FACILITATING INTERDISCIPLINARY COLLABORA-*
19 *TIONS FOR NATIONAL NEEDS.*

(a) *IN GENERAL.*—The Director shall award competitive, merit-based awards in amounts not to exceed \$5,000,000 over a period of up to 5 years to interdisciplinary research collaborations that are likely to assist in addressing critical challenges to national security, competitiveness, and societal well-being and that—

1 (1) *involve at least 2 co-equal principal inves-*
 2 *tigators at the same or different institutions;*

3 (2) *draw upon well-integrated, diverse teams of*
 4 *investigators, including students or postdoctoral re-*
 5 *searchers, from one or more disciplines; and*

6 (3) *foster creativity and pursue high-risk, high-*
 7 *reward research.*

8 (b) *PRIORITY.—In selecting grant recipients under*
 9 *this section, the Director shall give priority to applicants*
 10 *that propose to utilize advances in cyberinfrastructure and*
 11 *simulation-based science and engineering.*

12 **SEC. 223. NATIONAL SCIENCE FOUNDATION MANUFAC-**
 13 **TURING RESEARCH AND EDUCATION.**

14 (a) *MANUFACTURING RESEARCH.—The Director shall*
 15 *carry out a program to award merit-reviewed, competitive*
 16 *grants to institutions of higher education to support funda-*
 17 *mental research leading to transformative advances in*
 18 *manufacturing technologies, processes, and enterprises that*
 19 *will support United States manufacturing through im-*
 20 *proved performance, productivity, sustainability, and com-*
 21 *petitiveness. Research areas may include—*

22 (1) *nanomanufacturing;*

23 (2) *manufacturing and construction machines*
 24 *and equipment, including robotics, automation, and*
 25 *other intelligent systems;*

- 1 (3) *manufacturing enterprise systems;*
- 2 (4) *advanced sensing and control techniques;*
- 3 (5) *materials processing; and*
- 4 (6) *information technologies for manufacturing,*
5 *including predictive and real-time models and sim-*
6 *ulations, and virtual manufacturing.*

7 (b) *MANUFACTURING EDUCATION.*—*In order to help*
8 *ensure a well-trained manufacturing workforce, the Direc-*
9 *tor shall award grants to strengthen and expand scientific*
10 *and technical education and training in advanced manu-*
11 *facturing, including through the Foundation’s Advanced*
12 *Technological Education program.*

13 **SEC. 224. STRENGTHENING INSTITUTIONAL RESEARCH**
14 **PARTNERSHIPS.**

15 (a) *IN GENERAL.*—*For any Foundation research*
16 *grant, in an amount greater than \$2,000,000, to be carried*
17 *out through a partnership that includes one or more minor-*
18 *ity-serving institutions or predominantly undergraduate*
19 *institutions and one or more institutions described in sub-*
20 *section (b), the Director shall award funds directly, accord-*
21 *ing to the budget justification described in the grant pro-*
22 *posal, to at least two of the institutions of higher education*
23 *in the partnership, including at least one minority-serving*
24 *institution or one predominantly undergraduate institu-*
25 *tion, to ensure a strong and equitable partnership.*

1 (b) *INSTITUTIONS.*—*The institutions referred to in*
 2 *subsection (a) are institutions of higher education that are*
 3 *among the 100 institutions receiving, over the 3-year period*
 4 *immediately preceding the awarding of grants, the highest*
 5 *amount of research funding from the Foundation.*

6 **SEC. 225. NATIONAL SCIENCE BOARD REPORT ON MID-**
 7 **SCALE INSTRUMENTATION.**

8 (a) *MID-SCALE RESEARCH INSTRUMENTATION*
 9 *NEEDS.*—*The National Science Board shall evaluate the*
 10 *needs, across all disciplines supported by the Foundation,*
 11 *for mid-scale research instrumentation that falls between*
 12 *the instruments funded by the Major Research Instrumenta-*
 13 *tion program and the very large projects funded by the*
 14 *Major Research Equipment and Facilities Construction*
 15 *program.*

16 (b) *REPORT ON MID-SCALE RESEARCH INSTRUMENTA-*
 17 *TION PROGRAM.*—*Not later than 1 year after the date of*
 18 *enactment of this Act, the National Science Board shall sub-*
 19 *mit to Congress a report on mid-scale research instrumenta-*
 20 *tion at the Foundation. At a minimum, this report shall*
 21 *include—*

22 (1) *the findings from the Board's evaluation of*
 23 *instrumentation needs required under subsection (a),*
 24 *including a description of differences across dis-*
 25 *ciplines and Foundation research directorates;*

1 (2) *a recommendation or recommendations re-*
2 *garding how the Foundation should set priorities for*
3 *mid-scale instrumentation across disciplines and*
4 *Foundation research directorates;*

5 (3) *a recommendation or recommendations re-*
6 *garding the appropriateness of expanding existing*
7 *programs, including the Major Research Instrumenta-*
8 *tion program or the Major Research Equipment and*
9 *Facilities Construction program, to support more in-*
10 *strumentation at the mid-scale;*

11 (4) *a recommendation or recommendations re-*
12 *garding the need for and appropriateness of a new,*
13 *Foundation-wide program or initiative in support of*
14 *mid-scale instrumentation, including any rec-*
15 *ommendations regarding the administration of and*
16 *budget for such a program or initiative and the ap-*
17 *propriate scope of instruments to be funded under*
18 *such a program or initiative; and*

19 (5) *any recommendation or recommendations re-*
20 *garding other options for supporting mid-scale re-*
21 *search instrumentation at the Foundation.*

1 **SEC. 226. SENSE OF CONGRESS ON OVERALL SUPPORT FOR**
 2 **RESEARCH INFRASTRUCTURE AT THE FOUN-**
 3 **DATION.**

4 *It is the sense of Congress that the Foundation should*
 5 *strive to keep the percentage of the Foundation budget de-*
 6 *voted to research infrastructure in the range of 24 to 27*
 7 *percent, as recommended in the 2003 National Science*
 8 *Board report entitled “Science and Engineering Infrastruc-*
 9 *ture for the 21st Century”.*

10 **SEC. 227. PARTNERSHIPS FOR INNOVATION.**

11 *(a) IN GENERAL.—The Director shall carry out a pro-*
 12 *gram to award merit-reviewed, competitive grants to insti-*
 13 *tutions of higher education to establish and to expand part-*
 14 *nerships that promote innovation and increase the economic*
 15 *and social impact of research by developing tools and re-*
 16 *sources to connect new scientific discoveries to practical*
 17 *uses.*

18 *(b) PARTNERSHIPS.—*

19 *(1) IN GENERAL.—To be eligible for funding*
 20 *under this section, an institution of higher education*
 21 *must propose establishment of a partnership that—*

22 *(A) includes at least one private sector enti-*
 23 *ty; and*

24 *(B) may include other institutions of higher*
 25 *education, public sector institutions, private sec-*

1 *tor entities, and social enterprise nonprofit orga-*
 2 *nizations.*

3 (2) *PRIORITY.—In selecting grant recipients*
 4 *under this section, the Director shall give priority to*
 5 *partnerships that include one or more institutions of*
 6 *higher education that are among the 100 institutions*
 7 *receiving, over the 3-year period immediately pre-*
 8 *ceding the awarding of grants, the highest amount of*
 9 *research funding from the Foundation and at least*
 10 *one of the following:*

11 (A) *A minority serving institution.*

12 (B) *A primarily undergraduate institution.*

13 (C) *A 2-year institution of higher edu-*
 14 *cation.*

15 (c) *PROGRAM.—Proposals funded under this section*
 16 *shall seek to—*

17 (1) *increase the economic or social impact of the*
 18 *most promising research at the institution or institu-*
 19 *tions of higher education that are members of the*
 20 *partnership through knowledge transfer or commer-*
 21 *cialization;*

22 (2) *increase the engagement of faculty and stu-*
 23 *dents across multiple disciplines and departments, in-*
 24 *cluding faculty and students in schools of business*

1 *and other appropriate non-STEM fields and dis-*
2 *ciplines in knowledge transfer activities;*

3 *(3) enhance education and mentoring of students*
4 *and faculty in innovation and entrepreneurship*
5 *through networks, courses, and development of best*
6 *practices and curricula;*

7 *(4) strengthen the culture of the institution or*
8 *institutions of higher education to undertake and par-*
9 *ticipate in activities related to innovation and lead-*
10 *ing to economic or social impact;*

11 *(5) broaden the participation of all types of in-*
12 *stitutions of higher education in activities to meet*
13 *STEM workforce needs and promote innovation and*
14 *knowledge transfer; and*

15 *(6) build lasting partnerships with local and re-*
16 *gional businesses, local and State governments, and*
17 *other relevant entities.*

18 *(d) ADDITIONAL CRITERIA.—In selecting grant recipi-*
19 *ents under this section, the Director shall also consider the*
20 *extent to which the applicants are able to demonstrate evi-*
21 *dence of institutional support for, and commitment to—*

22 *(1) achieving the goals of the program as de-*
23 *scribed in subsection (c);*

1 (2) *expansion to an institution-wide program if*
 2 *the initial proposal is not for an institution-wide*
 3 *program; and*

4 (3) *sustaining any new innovation tools and re-*
 5 *sources generated from funding under this program.*

6 (e) *LIMITATION.—No funds provided under this section*
 7 *may be used to construct or renovate a building or struc-*
 8 *ture.*

9 **SEC. 228. PRIZE AWARDS.**

10 (a) *SHORT TITLE.—This section may be cited as the*
 11 *“Generating Extraordinary New Innovations in the United*
 12 *States Act of 2010”.*

13 (b) *IN GENERAL.—The Director shall carry out a pilot*
 14 *program to award innovation inducement cash prizes in*
 15 *any area of research supported by the Foundation. The Di-*
 16 *rector may carry out a program of cash prizes only in con-*
 17 *formity with this section.*

18 (c) *TOPICS.—In identifying topics for prize competi-*
 19 *tions under this section, the Director shall—*

20 (1) *consult widely both within and outside the*
 21 *Federal Government;*

22 (2) *give priority to high-risk, high-reward re-*
 23 *search challenges and to problems whose solution*
 24 *could improve the economic competitiveness of the*
 25 *United States; and*

1 (3) *give consideration to the extent to which the*
2 *topics have the potential to raise public awareness*
3 *about federally sponsored research.*

4 (d) *TYPES OF CONTESTS.—The Director shall consider*
5 *all categories of innovation inducement prizes, including—*

6 (1) *contests in which the award is to the first*
7 *team or individual who accomplishes a stated objec-*
8 *tive; and*

9 (2) *contests in which the winner is the team or*
10 *individual who comes closest to achieving an objective*
11 *within a specified time.*

12 (e) *ADVERTISING AND ANNOUNCEMENT.—*

13 (1) *ADVERTISING AND SOLICITATION OF COM-*
14 *PETITORS.—The Director shall widely advertise prize*
15 *competitions to encourage broad participation, in-*
16 *cluding by individuals, institutions of higher edu-*
17 *cation, nonprofit organizations, and businesses.*

18 (2) *ANNOUNCEMENT THROUGH FEDERAL REG-*
19 *ISTER NOTICE.—The Director shall announce each*
20 *prize competition by publishing a notice in the Fed-*
21 *eral Register. This notice shall include the subject of*
22 *the competition, the duration of the competition, the*
23 *eligibility requirements for participation in the com-*
24 *petition, the process for participants to register for*
25 *the competition, the amount of the prize, and the cri-*

1 *teria for awarding the prize, including the method by*
 2 *which the prize winner or winners will be selected.*

3 (3) *TIME TO ANNOUNCEMENT.*—*The Director*
 4 *shall announce a prize competition within 18 months*
 5 *after receipt of appropriated funds.*

6 (f) *FUNDING.*—

7 (1) *FUNDING SOURCES.*—*Prizes under this sec-*
 8 *tion shall consist of Federal appropriated funds and*
 9 *any funds raised pursuant to donations authorized*
 10 *under section 11(f) of the National Science Founda-*
 11 *tion Act of 1950 (42 U.S.C. 1870(f)) for specific prize*
 12 *competitions.*

13 (2) *ANNOUNCEMENT OF PRIZES.*—*The Director*
 14 *may not issue a notice as required by subsection*
 15 *(e)(2) until all of the funds needed to pay out the an-*
 16 *nounced amount of the prize have been appropriated*
 17 *or committed in writing by another entity pursuant*
 18 *to paragraph (1).*

19 (g) *ELIGIBILITY.*—*To be eligible to win a prize under*
 20 *this section, an individual or entity—*

21 (1) *shall have complied with all of the require-*
 22 *ments under this section;*

23 (2) *in the case of a private entity, shall be incor-*
 24 *porated in and maintain a primary place of business*
 25 *in the United States, and in the case of an indi-*

vidual, whether participating singly or in a group, shall be a United States citizen or national, or an alien lawfully admitted to the United States for permanent residence;

(3) shall not be a Federal entity, a Federal employee acting within the scope of his or her employment, or a person employed at a Federal laboratory acting within the scope of his or her employment; and

(4) shall not have utilized Federal funds to engage in the research for which the prize is being awarded.

(h) AWARDS.—

(1) NUMBER OF COMPETITIONS.—The Director may announce up to 5 prize competitions through the end of fiscal year 2013.

(2) SIZE OF AWARD.—The Director may determine the amount of each prize award based on the prize topic, but no award shall be less than \$1,000,000 or greater than \$3,000,000.

(3) SELECTING WINNERS.—The Director may convene an expert panel to select a winner of a prize competition. If the panel is unable to select a winner, the Director shall determine the winner of the prize.

1 (4) *PUBLIC OUTREACH.*—*The Director shall pub-*
2 *licly award prizes utilizing the Foundation’s existing*
3 *public affairs and public outreach resources.*

4 (i) *ADMINISTERING THE COMPETITION.*—*The Director*
5 *may enter into an agreement with a private, nonprofit enti-*
6 *ty to administer the prize competition, subject to the provi-*
7 *sions of this section.*

8 (j) *INTELLECTUAL PROPERTY.*—*The Federal Govern-*
9 *ment shall not, by virtue of offering or awarding a prize*
10 *under this section, be entitled to any intellectual property*
11 *rights derived as a consequence of, or in direct relation to,*
12 *the participation by a registered participant in a competi-*
13 *tion authorized by this section. This subsection shall not*
14 *be construed to prevent the Federal Government from nego-*
15 *tiating a license for the use of intellectual property devel-*
16 *oped for a prize competition under this section.*

17 (k) *LIABILITY.*—*The Director may require a registered*
18 *participant in a prize competition under this section to*
19 *waive liability against the Federal Government for injuries*
20 *and damages that result from participation in such com-*
21 *petition.*

22 (l) *NONSUBSTITUTION.*—*Any programs created under*
23 *this section shall not be considered a substitute for Federal*
24 *research and development programs.*

1 (m) *REPORTING REQUIREMENT.*—Not later than 5
2 years after the date of enactment of this Act, the National
3 Science Board shall transmit to Congress a report con-
4 taining the results of a review and assessment of the pilot
5 program under this section, including—

6 (1) a description of the nature and status of all
7 completed or ongoing prize competitions carried out
8 under this section, including any scientific achieve-
9 ments, publications, intellectual property, or commer-
10 cialized technology that resulted from such competi-
11 tions;

12 (2) any recommendations regarding changes to,
13 the termination of, or continuation of the pilot pro-
14 gram;

15 (3) an analysis of whether the program is at-
16 tracting contestants more diverse than the Founda-
17 tion's traditional academic constituency;

18 (4) an analysis of whether public awareness of
19 innovation or of the goal of the particular prize or
20 prizes is enhanced;

21 (5) an analysis of whether the Foundation's pub-
22 lic image or ability to increase public scientific lit-
23 eracy is enhanced through the use of innovation in-
24 ducement prizes; and

1 (6) *an analysis of the extent to which private*
2 *funds are being used to support registered partici-*
3 *pants.*

4 (n) *EARLY TERMINATION OF CONTESTS.—The Direc-*
5 *tor shall terminate a prize contest before any registered par-*
6 *ticipant wins if the Director determines that an unregis-*
7 *tered entity has produced an innovation that would other-*
8 *wise have qualified for the prize award.*

9 (o) *AUTHORIZATION OF APPROPRIATIONS.—*

10 (1) *IN GENERAL.—*

11 (A) *AWARDS.—There are authorized to be*
12 *appropriated to the Director for the period en-*
13 *compassing fiscal years 2011 through 2013*
14 *\$12,000,000 for carrying out this section.*

15 (B) *ADMINISTRATION.—Of the amounts au-*
16 *thorized in subparagraph (A), not more than 15*
17 *percent for each fiscal year shall be available for*
18 *the administrative costs of carrying out this sec-*
19 *tion.*

20 (2) *CARRYOVER OF FUNDS.—Funds appropriated*
21 *for prize awards under this section shall remain*
22 *available until expended, and may be transferred, re-*
23 *programmed, or expended for other purposes as au-*
24 *thorized by law only after the expiration of 7 fiscal*
25 *years after the fiscal year for which the funds were*

1 originally appropriated. No provision in this section
 2 permits obligation or payment of funds in violation
 3 of section 1341 of title 31 of the United States Code
 4 (commonly referred to as the Anti-Deficiency Act).

5 ***Subtitle C—STEM Education and***
 6 ***Workforce Training***

7 ***SEC. 241. GRADUATE STUDENT SUPPORT.***

8 (a) *FINDING.*—The Congress finds that—

9 (1) *the Integrative Graduate Education and Re-*
 10 *search Traineeship program is an important program*
 11 *for training the next generation of scientists and engi-*
 12 *neers in team-based interdisciplinary research and*
 13 *problem solving, and for providing them with the*
 14 *many additional skills, such as communication skills,*
 15 *needed to thrive in diverse STEM careers; and*

16 (2) *the Integrative Graduate Education and Re-*
 17 *search Traineeship program is no less valuable to the*
 18 *preparation and support of graduate students than*
 19 *the Foundation’s Graduate Research Fellowship pro-*
 20 *gram.*

21 (b) *EQUAL TREATMENT OF IGERT AND GRF.*—Be-
 22 *ginning in fiscal year 2011, the Director shall increase or,*
 23 *if necessary, decrease funding for the Foundation’s Integra-*
 24 *tive Graduate Education and Research Traineeship pro-*
 25 *gram (or any program by which it is replaced) at least*

1 *at the same rate as it increases or decreases funding for*
2 *the Graduate Research Fellowship program.*

3 *(c) SUPPORT FOR GRADUATE STUDENT RESEARCH*
4 *FROM THE RESEARCH ACCOUNT.—For each of the fiscal*
5 *years 2011 through 2015, at least 50 percent of the total*
6 *Foundation funds allocated to the Integrative Graduate*
7 *Education and Research Traineeship program and the*
8 *Graduate Research Fellowship program shall come from*
9 *funds appropriated for Research and Related Activities.*

10 *(d) COST OF EDUCATION ALLOWANCE FOR GRF PRO-*
11 *GRAM.—Section 10 of the National Science Foundation Act*
12 *of 1950 (42 U.S.C. 1869) is amended—*

13 *(1) by inserting “(a)” before “The Foundation is*
14 *authorized”; and*

15 *(2) by adding at the end the following new sub-*
16 *section:*

17 *“(b) The Director shall establish for each year the*
18 *amount to be awarded for scholarships and fellowships*
19 *under this section for that year. Each such scholarship and*
20 *fellowship shall include a cost of education allowance of*
21 *\$12,000, subject to any restrictions on the use of edu-*
22 *cation allowance as determined by the Director.”.*

1 **SEC. 242. POSTDOCTORAL FELLOWSHIP IN STEM EDU-**
2 **CATION RESEARCH.**

3 (a) *IN GENERAL.*—*The Director shall establish*
4 *postdoctoral fellowships in STEM education research to*
5 *provide recent doctoral degree graduates in STEM fields*
6 *with the necessary skills to assume leadership roles in*
7 *STEM education research, program development, and eval-*
8 *uation in our Nation’s diverse educational institutions.*

9 (b) *AWARDS.*—

10 (1) *DURATION.*—*Fellowships may be awarded*
11 *under this section for a period of up to 24 months in*
12 *duration, renewable for an additional 12 months. The*
13 *Director shall establish criteria for eligibility for re-*
14 *newal of the fellowship.*

15 (2) *STIPEND.*—*The Director shall determine the*
16 *amount of the award for a fellowship, which shall in-*
17 *clude a stipend and a research allowance, and may*
18 *include an educational allowance.*

19 (3) *LOCATION.*—*A fellowship shall be awarded*
20 *for research at any institution of higher education*
21 *that offers degrees in fields supported by the Founda-*
22 *tion, or at any institution or organization that the*
23 *Director determines is eligible for education research*
24 *grants from the Foundation.*

25 (4) *NUMBER OF AWARDS.*—*The Director may*
26 *award up to 20 new fellowships per year.*

1 (c) *RESEARCH.*—*Fellowships under this section shall*
2 *be awarded for research on STEM education at any edu-*
3 *cational level, including grades pre-K-12, undergraduate,*
4 *graduate, and general public education, in both formal and*
5 *informal settings. Research topics may include—*

6 (1) *learning processes and progressions;*

7 (2) *knowledge transfer, including curriculum de-*
8 *velopment;*

9 (3) *uses of technology as teaching and learning*
10 *tools;*

11 (4) *integrating STEM fields; and*

12 (5) *assessment of student learning and program*
13 *evaluation.*

14 (d) *ELIGIBILITY.*—*To be eligible for a fellowship under*
15 *this section, an individual must—*

16 (1) *be a United States citizen or national, or an*
17 *alien lawfully admitted to the United States for per-*
18 *manent residence, at the time of application; and*

19 (2) *have received a doctoral degree in one of the*
20 *STEM fields supported by the Foundation within 3*
21 *years prior to the fellowship application deadline.*

1 **SEC. 243. ROBERT NOYCE TEACHER SCHOLARSHIP PRO-**
 2 **GRAM.**

3 *Section 10A of the National Science Foundation Au-*
 4 *thorization Act of 2002 (42 U.S.C. 1862n–1a) is amended*
 5 *in subsection (h)(1) by—*

6 *(1) striking “50” and inserting “30”; and*

7 *(2) striking “which may be provided in cash or*
 8 *in-kind” and inserting “which shall be provided in*
 9 *cash”.*

10 **SEC. 244. INSTITUTIONS SERVING PERSONS WITH DISABIL-**
 11 **ITIES.**

12 *For the purposes of the activities and programs sup-*
 13 *ported by the Foundation, institutions of higher education*
 14 *chartered to serve large numbers of students with disabil-*
 15 *ities, including Gallaudet University, Landmark College,*
 16 *and the National Technical Institute for the Deaf, shall*
 17 *have a designation consistent with the designation for other*
 18 *institutions that serve populations underrepresented in*
 19 *STEM to ensure that institutions of higher education char-*
 20 *tered to serve persons with disabilities can benefit from*
 21 *STEM bridge programs and from research partnerships*
 22 *with major research universities. Nothing in this section*
 23 *shall be construed to amend or otherwise affect any of the*
 24 *definitions for minority-serving institutions under title III*
 25 *or title V of the Higher Education Act of 1965.*

1 **SEC. 245. INSTITUTIONAL INTEGRATION.**

2 (a) *INNOVATION THROUGH INSTITUTIONAL INTEGRA-*
3 *TION.—The Director shall award grants for the institu-*
4 *tional integration of projects funded by the Foundation*
5 *with a focus on education, or on broadening participation*
6 *in STEM by underrepresented groups, for the purpose of*
7 *increasing collaboration and coordination across funded*
8 *projects and institutions and expanding the impact of such*
9 *projects within and among institutions of higher education*
10 *in an innovative and sustainable manner.*

11 (b) *PROGRAM ACTIVITIES.—The program under this*
12 *section shall support integrative activities that involve the*
13 *strategic and innovative combination of Foundation-funded*
14 *projects and that provide for—*

15 (1) *additional opportunities to increase the re-*
16 *cruitment, retention, and degree attainment of under-*
17 *represented groups in STEM disciplines;*

18 (2) *the inclusion of programming, practices, and*
19 *policies that encourage the integration of education*
20 *and research;*

21 (3) *seamless transitions from one educational*
22 *level to another; and*

23 (4) *other activities that expand and deepen the*
24 *impact of Foundation-funded projects with a focus on*
25 *education, or on broadening participation in STEM*

1 *by underrepresented groups, and enhance their sus-*
 2 *tainability.*

3 (c) *REVIEW CRITERIA.*—*In selecting recipients of*
 4 *grants under this section, the Director shall consider at a*
 5 *minimum—*

6 (1) *the extent to which the proposed project ad-*
 7 *dresses the goals of project and program integration*
 8 *and adds value to the existing funded projects;*

9 (2) *the extent to which there is a proven record*
 10 *of success for the existing projects on which the pro-*
 11 *posed integration project is based; and*

12 (3) *the extent to which the proposed project ad-*
 13 *dresses the modification of programming, practices,*
 14 *and policies necessary to achieve the purpose de-*
 15 *scribed in subsection (a).*

16 (d) *PRIORITY.*—*In selecting recipients of grants under*
 17 *this section, the Director shall give priority to proposals*
 18 *for which a senior institutional administrator, including*
 19 *a dean or other administrator of equal or higher rank,*
 20 *serves as the principal investigator.*

21 **SEC. 246. POSTDOCTORAL RESEARCH FELLOWSHIPS.**

22 (a) *IN GENERAL.*—*The Director shall establish a*
 23 *Foundation-wide postdoctoral research fellowship program,*
 24 *to award competitive, merit-based postdoctoral research fel-*

1 *lowships in any field of research supported by the Founda-*
2 *tion.*

3 (b) *DURATION AND AMOUNT.*—*Fellowships may be*
4 *awarded under this section for a period of up to 3 years*
5 *in duration. The Director shall determine the amount of*
6 *the award for a fellowship, which shall include a stipend*
7 *and a research allowance, and may include an educational*
8 *allowance.*

9 (c) *ELIGIBILITY.*—*To be eligible to receive a fellowship*
10 *under this section, an individual—*

11 (1) *must be a United States citizen or national,*
12 *or an alien lawfully admitted to the United States for*
13 *permanent residence, at the time of application;*

14 (2) *must have received a doctoral degree in any*
15 *field of research supported by the Foundation within*
16 *3 years prior to the fellowship application deadline,*
17 *or will complete a doctoral degree no more than 1*
18 *year after the application deadline; and*

19 (3) *may not have previously received funding as*
20 *the principal investigator of a research grant from the*
21 *Foundation, unless such funding was received as a*
22 *graduate student.*

23 (d) *PRIORITY.*—*In evaluating applications for fellow-*
24 *ships under this section, the Director shall give priority to*
25 *applications that include—*

1 (1) *proposals for interdisciplinary research; or*
 2 (2) *proposals for high-risk, high-reward research.*
 3 (e) *ADDITIONAL CONSIDERATIONS.—In evaluating ap-*
 4 *plications for fellowships under this section, the Director*
 5 *shall give consideration to the goal of promoting the partici-*
 6 *pation of individuals identified in section 33 or 34 of the*
 7 *Science and Engineering Equal Opportunities Act (42*
 8 *U.S.C. 1885a or 1885b).*

9 (f) *NONSUBSTITUTION.—The fellowship program au-*
 10 *thorized under this section is not intended to replace or re-*
 11 *duce support for postdoctoral research through existing pro-*
 12 *grams at the Foundation.*

13 **SEC. 247. BROADENING PARTICIPATION TRAINING AND**
 14 **OUTREACH.**

15 *The Director shall provide education and training—*

16 (1) *to Foundation staff and grant proposal re-*
 17 *view panels on effective mechanisms and tools for*
 18 *broadening participation in STEM by underrep-*
 19 *resented groups, including reviewer selection and*
 20 *mitigation of implicit bias in the review process; and*

21 (2) *to Foundation staff on related outreach ap-*
 22 *proaches.*

1 **SEC. 248. TRANSFORMING UNDERGRADUATE EDUCATION**
 2 **IN STEM.**

3 *Section 17 of the National Science Foundation Author-*
 4 *ization Act of 2002 (42 U.S.C. 1862n–6) is amended to read*
 5 *as follows:*

6 **“SEC. 17. TRANSFORMING UNDERGRADUATE EDUCATION IN**
 7 **STEM.**

8 *“(a) IN GENERAL.—The Director shall award grants,*
 9 *on a competitive, merit-reviewed basis, to institutions of*
 10 *higher education (or to consortia thereof) to reform under-*
 11 *graduate STEM education for the purpose of increasing the*
 12 *number and quality of students studying toward and com-*
 13 *pleting baccalaureate degrees in STEM and improving the*
 14 *STEM learning outcomes for all undergraduate students,*
 15 *including through—*

16 *“(1) development, implementation, and assess-*
 17 *ment of innovative, research-based approaches to*
 18 *transforming the teaching and learning of discipli-*
 19 *nary or interdisciplinary STEM at the under-*
 20 *graduate level; and*

21 *“(2) expansion of successful STEM reform efforts*
 22 *beyond a single course or group of courses to achieve*
 23 *reform within an entire academic unit, or expansion*
 24 *of successful reform efforts beyond a single academic*
 25 *unit to other STEM academic units within an insti-*

1 *tution or to comparable academic units at other insti-*
2 *tutions.*

3 “(b) *USES OF FUNDS.—Activities supported by grants*
4 *under this section may include—*

5 “(1) *creation of multidisciplinary or inter-*
6 *disciplinary courses or programs that formalize col-*
7 *laborations for the purpose of improved student in-*
8 *struction and research in STEM;*

9 “(2) *expansion of undergraduate STEM research*
10 *opportunities to include interdisciplinary research*
11 *opportunities and research opportunities in industry,*
12 *at Federal labs, and at international research institu-*
13 *tions or research sites;*

14 “(3) *implementation or expansion of bridge pro-*
15 *grams, including programs that address student tran-*
16 *sition from 2-year to 4-year institutions, and cohort,*
17 *tutoring, or mentoring programs proven to enhance*
18 *student recruitment or persistence to degree comple-*
19 *tion in STEM, including recruitment or persistence*
20 *to degree completion of individuals identified in sec-*
21 *tion 33 or 34 of the Science and Engineering Equal*
22 *Opportunities Act (42 U.S.C. 1885a or 1885b);*

23 “(4) *improvement of undergraduate STEM edu-*
24 *cation for nonmajors, including education majors;*

1 “(5) implementation of evidence-based, tech-
2 nology-driven reform efforts that directly impact un-
3 dergraduate STEM instruction or research experi-
4 ences;

5 “(6) development and implementation of faculty
6 and graduate teaching assistant development pro-
7 grams focused on improved instruction, mentoring,
8 assessment of student learning, and support of under-
9 graduate STEM students;

10 “(7) support for graduate students and
11 postdoctoral fellows to participate in instructional or
12 assessment activities at primarily undergraduate in-
13 stitutions;

14 “(8) research on teaching and learning of STEM
15 at the undergraduate level related to the proposed re-
16 form effort, including assessment and evaluation of
17 the proposed reform activities, research on scalability
18 and sustainability of approaches to reform, and devel-
19 opment and implementation of longitudinal studies of
20 students included in the proposed reform effort; and

21 “(9) support for initiatives that advance the in-
22 tegration of global challenges such as sustainability
23 into disciplinary and interdisciplinary STEM edu-
24 cation.

1 “(c) *PARTNERSHIP.*—*An institution of higher edu-*
2 *cation may partner with one or more other nonprofit edu-*
3 *cation or research organizations, including scientific and*
4 *engineering societies, for the purposes of carrying out the*
5 *activities authorized under this section.*

6 “(d) *SELECTION PROCESS.*—

7 “(1) *APPLICATIONS.*—*An institution of higher*
8 *education seeking a grant under this section shall*
9 *submit an application to the Director at such time,*
10 *in such manner, and containing such information as*
11 *the Director may require. The application shall in-*
12 *clude, at a minimum—*

13 “(A) *a description of the proposed reform*
14 *effort;*

15 “(B) *a description of the research findings*
16 *that will serve as the basis for the proposed re-*
17 *form effort or, in the case of applications that*
18 *propose an expansion of a previously imple-*
19 *mented reform effort, a description of the pre-*
20 *viously implemented reform effort, including in-*
21 *dicators of success such as data on student re-*
22 *cruitment, persistence to degree completion, and*
23 *academic achievement;*

24 “(C) *evidence of institutional support for,*
25 *and commitment to, the proposed reform effort,*

1 *including long-term commitment to implement*
2 *successful strategies from the current reform ef-*
3 *fort beyond the academic unit or units included*
4 *in the grant proposal or to disseminate successful*
5 *strategies to other institutions;*

6 “(D) *a description of existing or planned*
7 *institutional policies and practices regarding*
8 *faculty hiring, promotion, tenure, and teaching*
9 *assignment that reward faculty contributions to*
10 *undergraduate STEM education; and*

11 “(E) *a description of the plans for assess-*
12 *ment and evaluation of the proposed reform ac-*
13 *tivities, including evidence of participation by*
14 *individuals with experience in assessment and*
15 *evaluation of teaching and learning programs.*

16 “(2) *REVIEW OF APPLICATIONS.—In selecting*
17 *grant recipients under this section, the Director shall*
18 *consider at a minimum—*

19 “(A) *the likelihood of success in undertaking*
20 *the proposed effort at the institution submitting*
21 *the application, including the extent to which the*
22 *faculty, staff, and administrators of the institu-*
23 *tion are committed to making the proposed insti-*
24 *tutional reform a priority of the participating*
25 *academic unit or units;*

1 “(B) the degree to which the proposed re-
2 form will contribute to change in institutional
3 culture and policy such that a greater value is
4 placed on faculty engagement in undergraduate
5 education;

6 “(C) the likelihood that the institution will
7 sustain or expand the reform beyond the period
8 of the grant; and

9 “(D) the degree to which scholarly assess-
10 ment and evaluation plans are included in the
11 design of the reform effort, including the degree
12 to which such assessment and evaluation con-
13 tribute to the systematic accumulation of knowl-
14 edge on STEM education.

15 “(3) PRIORITY.—For proposals that include an
16 expansion of existing reform efforts beyond a single
17 academic unit, the Director shall give priority to pro-
18 posals for which a senior institutional administrator,
19 including a dean or other administrator of equal or
20 higher rank, serves as the principal investigator or a
21 coprincipal investigator.

22 “(4) GRANT DISTRIBUTION.—The Director shall
23 ensure, to the extent practicable, that grants awarded
24 under this section are made to a variety of types of
25 institutions of higher education.”.

1 **SEC. 249. 21ST CENTURY GRADUATE EDUCATION.**

2 (a) *IN GENERAL.*—*The Director shall award grants,*
3 *on a competitive, merit-reviewed basis, to institutions of*
4 *higher education to implement or expand research-based re-*
5 *forms in master’s and doctoral level STEM education that*
6 *emphasize preparation for diverse careers utilizing STEM*
7 *degrees, including at diverse types of institutions of higher*
8 *education, in industry, and at government agencies and re-*
9 *search laboratories.*

10 (b) *USES OF FUNDS.*—*Activities supported by grants*
11 *under this section may include—*

12 (1) *creation of multidisciplinary or interdiscipli-*
13 *nary courses or programs for the purpose of improved*
14 *student instruction and research in STEM;*

15 (2) *expansion of graduate STEM research oppor-*
16 *tunities to include interdisciplinary research opportu-*
17 *nities and research opportunities in industry, at Fed-*
18 *eral laboratories, and at international research insti-*
19 *tutions or research sites;*

20 (3) *development and implementation of future*
21 *faculty training programs focused on improved in-*
22 *struction, mentoring, assessment of student learning,*
23 *and support of undergraduate STEM students;*

24 (4) *support and training for graduate students*
25 *to participate in instructional activities beyond the*
26 *traditional teaching assistantship, and especially as*

1 *part of ongoing educational reform efforts, including*
2 *at pre-K-12 schools, informal science education insti-*
3 *tutions, and primarily undergraduate institutions;*

4 *(5) creation, improvement, or expansion of inno-*
5 *vative graduate programs such as science master's de-*
6 *gree programs;*

7 *(6) development and implementation of semi-*
8 *nars, workshops, and other professional development*
9 *activities that increase the ability of graduate stu-*
10 *dents to engage in innovation, technology transfer,*
11 *and entrepreneurship;*

12 *(7) development and implementation of semi-*
13 *nars, workshops, and other professional development*
14 *activities that increase the ability of graduate stu-*
15 *dents to effectively communicate their research find-*
16 *ings to technical audiences outside of their own dis-*
17 *cipline and to nontechnical audiences;*

18 *(8) expansion of successful STEM reform efforts*
19 *beyond a single academic unit to other STEM aca-*
20 *demic units within an institution or to comparable*
21 *academic units at other institutions; and*

22 *(9) research on teaching and learning of STEM*
23 *at the graduate level related to the proposed reform ef-*
24 *fort, including assessment and evaluation of the pro-*

1 *posed reform activities and research on scalability*
2 *and sustainability of approaches to reform.*

3 *(c) PARTNERSHIP.—An institution of higher education*
4 *may partner with one or more other nonprofit education*
5 *or research organizations, including scientific and engineer-*
6 *ing societies, for the purposes of carrying out the activities*
7 *authorized under this section.*

8 *(d) SELECTION PROCESS.—*

9 *(1) APPLICATIONS.—An institution of higher*
10 *education seeking a grant under this section shall*
11 *submit an application to the Director at such time,*
12 *in such manner, and containing such information as*
13 *the Director may require. The application shall in-*
14 *clude, at a minimum—*

15 *(A) a description of the proposed reform ef-*
16 *fort;*

17 *(B) in the case of applications that propose*
18 *an expansion of a previously implemented re-*
19 *form effort at the applicant's institution or at*
20 *other institutions, a description of the previously*
21 *implemented reform effort;*

22 *(C) evidence of institutional support for,*
23 *and commitment to, the proposed reform effort,*
24 *including long-term commitment to implement*
25 *successful strategies from the current reform ef-*

1 *fort beyond the academic unit or units included*
2 *in the grant proposal or to disseminate successful*
3 *strategies to other institutions; and*

4 *(D) a description of the plans for assess-*
5 *ment and evaluation of the grant proposed re-*
6 *form activities.*

7 *(2) REVIEW OF APPLICATIONS.—In selecting*
8 *grant recipients under this section, the Director shall*
9 *consider at a minimum—*

10 *(A) the likelihood of success in undertaking*
11 *the proposed effort at the institution submitting*
12 *the application, including the extent to which the*
13 *faculty, staff, and administrators of the institu-*
14 *tion are committed to making the proposed insti-*
15 *tutional reform a priority of the participating*
16 *academic unit or units;*

17 *(B) the degree to which the proposed reform*
18 *will contribute to change in institutional culture*
19 *and policy such that a greater value is placed on*
20 *preparing graduate students for diverse careers*
21 *utilizing STEM degrees;*

22 *(C) the likelihood that the institution will*
23 *sustain or expand the reform beyond the period*
24 *of the grant; and*

1 (D) the degree to which scholarly assessment
 2 and evaluation plans are included in the design
 3 of the reform effort.

4 (e) *REPEAL*.—Section 7034 of the America COM-
 5 *PETES Act* (42 U.S.C. 18620–13) is repealed.

6 **SEC. 250. UNDERGRADUATE BROADENING PARTICIPATION**
 7 **PROGRAM.**

8 (a) *UNDERGRADUATE BROADENING PARTICIPATION*
 9 *PROGRAM*.—The Foundation shall continue to support the
 10 *Historically Black Colleges and Universities Undergraduate*
 11 *Program, the Louis Stokes Alliances for Minority Partici-*
 12 *pation program, and the Tribal Colleges and Universities*
 13 *Program as separate programs at least through September*
 14 *30, 2011.*

15 (b) *PLAN*.—Prior to any realignment or consolidation
 16 of the programs described in subsection (a), in addition to
 17 the *Hispanic-Serving Institutions Undergraduate Program*
 18 required by section 7033 of the *America COMPETES Act*
 19 (42 U.S.C. 18620–12), the Director shall develop a plan
 20 clarifying the objectives and rationale for such changes. The
 21 plan shall include a description of how such changes would
 22 result in—

23 (1) meeting or strengthening the common goal of
 24 the separate programs to increase the number of indi-

1 *viduals from underrepresented groups attaining un-*
2 *dergraduate STEM degrees; and*

3 *(2) addressing the unique needs of the different*
4 *types of minority serving institutions and underrep-*
5 *resented groups currently provided for by the separate*
6 *programs.*

7 *(c) RECOMMENDATIONS.—In the development of the*
8 *plan required under subsection (b), the Director shall at a*
9 *minimum—*

10 *(1) consider the recommendations and findings*
11 *of the National Academy of Sciences report required*
12 *by section 7032 of the America COMPETES Act*
13 *(Public Law 110–69); and*

14 *(2) solicit recommendations and feedback from a*
15 *wide range of stakeholders, including representatives*
16 *from minority serving institutions, other institutions*
17 *of higher education, and other entities with expertise*
18 *on effective mechanisms to increase the recruitment*
19 *and retention of members of underrepresented groups*
20 *in STEM fields, and the attainment of STEM degrees*
21 *by underrepresented groups.*

22 *(d) APPROVAL BY CONGRESS.—The plan developed*
23 *under this section shall be transmitted to Congress at least*
24 *3 months prior to the implementation of any realignment*
25 *or consolidation of the programs described in subsection (a).*

1 **SEC. 251. GRAND CHALLENGES IN EDUCATION RESEARCH.**

2 (a) *IN GENERAL.*—*The Director and the Secretary of*
3 *Education shall collaborate, in consultation with the Direc-*
4 *tor of the National Institutes of Health, in—*

5 (1) *identifying, prioritizing, and developing*
6 *strategies to address grand challenges in research and*
7 *development on the teaching and learning of STEM*
8 *at the pre-K-12 level, in formal and informal settings,*
9 *for diverse learning populations, including individ-*
10 *uals identified in section 33 or 34 of the Science and*
11 *Engineering Equal Opportunities Act (42 U.S.C.*
12 *1885a or 1885b), and students in rural schools;*

13 (2) *carrying out research and development to ad-*
14 *dress the grand challenges identified in paragraph*
15 *(1); and*

16 (3) *ensuring the dissemination of the results of*
17 *such research and development.*

18 (b) *STAKEHOLDER INPUT.*—*In identifying the grand*
19 *challenges required in subsection (a), the Director and the*
20 *Secretary shall—*

21 (1) *take into consideration critical research gaps*
22 *identified in existing reports, including reports by the*
23 *National Academies, on the teaching and learning of*
24 *STEM at the pre-K-12 level in formal and informal*
25 *settings; and*

1 (2) *solicit input from a wide range of stake-*
2 *holders, including local and State education officials,*
3 *STEM teachers, STEM education researchers, sci-*
4 *entific and engineering societies, STEM faculty at in-*
5 *stitutions of higher education, informal STEM edu-*
6 *cation providers, businesses with a large STEM work-*
7 *force, and other stakeholders in the teaching and*
8 *learning of STEM at the pre-K-12 level, and may*
9 *enter into an arrangement with the National Re-*
10 *search Council for these purposes.*

11 (c) *TOPICS TO CONSIDER.—In identifying the grand*
12 *challenges required in subsection (a), the Director and the*
13 *Secretary, in order to provide students with increased ac-*
14 *cess to rigorous courses of study in STEM, increase the*
15 *number of students who are prepared for advanced study*
16 *and careers in STEM, and increase the effective teaching*
17 *of STEM subjects, shall at a minimum consider the fol-*
18 *lowing topics:*

19 (1) *Research on scalability, sustainability, and*
20 *replication of successful STEM activities, programs,*
21 *and models, in formal and informal environments.*

22 (2) *Research that utilizes a systems approach to*
23 *identifying challenges and opportunities to improve*
24 *the teaching and learning of STEM, including devel-*
25 *opment and evaluation of model systems that support*

1 *improved teaching and learning of STEM across en-*
2 *tire school districts and States, and encompassing*
3 *and integrating the teaching and learning of STEM*
4 *in formal and informal venues, and in K-12 schools*
5 *and institutions of higher education.*

6 *(3) Research to understand what makes a STEM*
7 *teacher effective and STEM teacher professional devel-*
8 *opment effective, including development of tools and*
9 *methodologies to measure STEM teacher effectiveness.*

10 *(4) Research and development on cyber-enabled*
11 *tools and programs and television based tools and*
12 *programs for learning and teaching STEM, including*
13 *development of tools and methodologies for assessing*
14 *cyber and television enabled teaching and learning.*

15 *(5) Research and development on STEM teach-*
16 *ing and learning in informal environments, including*
17 *development of tools and methodologies for assessing*
18 *STEM teaching and learning in informal environ-*
19 *ments.*

20 *(6) Research and development on how inte-*
21 *grating engineering with mathematics and science*
22 *education may—*

23 *(A) improve student learning of mathe-*
24 *matics and science;*

1 (B) increase student interest and persistence
2 in STEM; or

3 (C) improve student understanding of engi-
4 neering design principles and of the built world.

5 (7) Research to understand what makes hands-
6 on, inquiry-based classroom experiences effective, in-
7 cluding development of tools and methodologies for as-
8 sessing such experiences.

9 (d) REPORT TO CONGRESS.—Not later than 18 months
10 after the date of enactment of this Act, the Director and
11 the Secretary shall report back to Congress with a descrip-
12 tion of—

13 (1) the grand challenges identified pursuant to
14 this section;

15 (2) the role of each agency in supporting re-
16 search and development activities to address the
17 grand challenges;

18 (3) the common metrics that will be used to as-
19 sess progress toward meeting the grand challenges;

20 (4) plans for periodically updating the grand
21 challenges;

22 (5) how the agencies will disseminate the results
23 of research and development activities carried out
24 under this section to STEM education practitioners,
25 to other Federal agencies that support STEM pro-

1 *grams and activities, and to non-Federal funders of*
 2 *STEM education; and*

3 *(6) how the agencies will support implementa-*
 4 *tion of best practices identified by the research and*
 5 *development activities.*

6 **SEC. 252. RESEARCH EXPERIENCES FOR UNDERGRADU-**
 7 **ATES.**

8 *(a) RESEARCH SITES.—The Director shall award*
 9 *grants, on a merit-reviewed, competitive basis, to institu-*
 10 *tions of higher education, nonprofit organizations, or con-*
 11 *sortia of such institutions and organizations, for sites des-*
 12 *ignated by the Director to provide research experiences for*
 13 *10 or more undergraduate STEM students, with consider-*
 14 *ation given to the goal of promoting the participation of*
 15 *individuals identified in section 33 or 34 of the Science and*
 16 *Engineering Equal Opportunities Act (42 U.S.C. 1885a or*
 17 *1885b). The Director shall ensure that—*

18 *(1) at least half of the students participating in*
 19 *a program funded by a grant under this subsection*
 20 *at each site shall be recruited from institutions of*
 21 *higher education where research opportunities in*
 22 *STEM are limited, including 2-year institutions;*

23 *(2) the awards provide undergraduate research*
 24 *experiences in a wide range of STEM disciplines;*

1 (3) the awards support a variety of projects, in-
 2 cluding independent investigator-led projects, inter-
 3 disciplinary projects, and multi-institutional projects
 4 (including virtual projects);

5 (4) students participating in each program fund-
 6 ed have mentors, including during the academic year
 7 to the extent practicable, to help connect the students'
 8 research experiences to the overall academic course of
 9 study and to help students achieve success in courses
 10 of study leading to a baccalaureate degree in a STEM
 11 field;

12 (5) mentors and students are supported with ap-
 13 propriate salary or stipends; and

14 (6) student participants are tracked, for employ-
 15 ment and continued matriculation in STEM fields,
 16 through receipt of the undergraduate degree and for at
 17 least 3 years thereafter.

18 (b) *INCLUSION OF UNDERGRADUATES IN STANDARD*
 19 *RESEARCH GRANTS.*—The Director shall require that every
 20 recipient of a research grant from the Foundation pro-
 21 posing to include 1 or more undergraduate students in car-
 22 rying out the research under the grant shall request support,
 23 including stipend support, for such undergraduate students
 24 as part of the research proposal itself rather than as a sup-
 25 plement to the research proposal, unless such undergraduate

1 participation was not foreseeable at the time of the original
2 proposal.

3 **SEC. 253. LABORATORY SCIENCE PILOT PROGRAM.**

4 Section 7026 of the America COMPETES Act (Public
5 Law 110–69) is amended by striking subsections (d) and
6 (e).

7 **SEC. 254. STEM INDUSTRY INTERNSHIP PROGRAMS.**

8 (a) *IN GENERAL.*—The Director may award grants,
9 on a competitive, merit-reviewed basis, to institutions of
10 higher education, or consortia thereof, to establish or expand
11 partnerships with local or regional private sector entities,
12 for the purpose of providing undergraduate students with
13 integrated internship experiences that connect private sector
14 internship experiences with the students’ STEM
15 coursework. Such partnerships may also include industry
16 or professional associations.

17 (b) *PRIORITY.*—In awarding grants under this section,
18 the Director shall give priority to institutions of higher edu-
19 cation or consortia thereof that demonstrate significant out-
20 reach to and coordination with local or regional private
21 sector entities in developing academic courses designed to
22 provide students with the skills necessary for employment
23 in local or regional companies.

1 (c) *COST-SHARE*.—*The Director shall require a 50 per-*
 2 *cent non-Federal cost-share from partnerships established or*
 3 *expanded under this section.*

4 (d) *RESTRICTION*.—*No Federal funds provided under*
 5 *this section may be used—*

6 (1) *for the purpose of providing stipends or com-*
 7 *pensation to students for private sector internships; or*

8 (2) *as payment or reimbursement to private sec-*
 9 *tor entities.*

10 (e) *REPORT*.—*Not less than 3 years after the date of*
 11 *enactment of this Act, the Director shall submit a report*
 12 *to Congress on the number and total value of awards made*
 13 *under this section, the number of students affected by those*
 14 *awards, and any evidence of the effect of those awards on*
 15 *workforce preparation and jobs placement for participating*
 16 *students.*

17 **SEC. 255. TRIBAL COLLEGES AND UNIVERSITIES PROGRAM.**

18 (a) *IN GENERAL*.—*The Director shall continue to sup-*
 19 *port a program to award grants on a competitive, merit-*
 20 *reviewed basis to tribal colleges and universities (as defined*
 21 *in section 316 of the Higher Education Act of 1965 (20*
 22 *U.S.C. 1059c)), including institutions described in section*
 23 *317 of such Act (20 U.S.C. 1059d), to enhance the quality*
 24 *of undergraduate STEM education at such institutions and*
 25 *to increase the retention and graduation rates of Native*

1 *American students pursuing associate's or baccalaureate de-*
 2 *grees in STEM.*

3 (b) *PROGRAM COMPONENTS.—Grants awarded under*
 4 *this section shall support—*

5 (1) *activities to improve courses and curriculum*
 6 *in STEM;*

7 (2) *faculty development;*

8 (3) *stipends for undergraduate students partici-*
 9 *pating in research; and*

10 (4) *other activities consistent with subsection (a),*
 11 *as determined by the Director.*

12 (c) *INSTRUMENTATION.—Funding provided under this*
 13 *section may be used for instrumentation.*

14 ***TITLE III—STEM EDUCATION***

15 ***SEC. 301. COORDINATION OF FEDERAL STEM EDUCATION.***

16 (a) *SHORT TITLE.—This section may be cited as the*
 17 *“STEM Education Coordination Act of 2010”.*

18 (b) *DEFINITION.—In this section, the term “STEM”*
 19 *means science, technology, engineering, and mathematics.*

20 (c) *ESTABLISHMENT.—The Director of the Office of*
 21 *Science and Technology Policy shall establish a committee*
 22 *under the National Science and Technology Council with*
 23 *the responsibility to coordinate Federal programs and ac-*
 24 *tivities in support of STEM education, including at the Na-*
 25 *tional Science Foundation, the Department of Energy, the*

1 *National Aeronautics and Space Administration, the Na-*
 2 *tional Oceanic and Atmospheric Administration, the De-*
 3 *partment of Education, and all other Federal agencies that*
 4 *have programs and activities in support of STEM edu-*
 5 *cation.*

6 (d) *RESPONSIBILITIES OF THE COMMITTEE.—The*
 7 *committee established under subsection (c) shall—*

8 (1) *coordinate the STEM education activities*
 9 *and programs of the Federal agencies;*

10 (2) *develop, implement through the participating*
 11 *agencies, and update once every 5 years a 5-year*
 12 *STEM education strategic plan, which shall—*

13 (A) *specify and prioritize annual and long-*
 14 *term objectives;*

15 (B) *specify the common metrics that will be*
 16 *used to assess progress toward achieving the ob-*
 17 *jectives;*

18 (C) *describe the approaches that will be*
 19 *taken by each participating agency to assess the*
 20 *effectiveness of its STEM education programs*
 21 *and activities; and*

22 (D) *with respect to subparagraph (A), de-*
 23 *scribe the role of each agency in supporting pro-*
 24 *grams and activities designed to achieve the ob-*
 25 *jectives; and*

1 (3) *establish, periodically update, and maintain*
2 *an inventory of federally sponsored STEM education*
3 *programs and activities, including documentation of*
4 *assessments of the effectiveness of such programs and*
5 *activities and rates of participation by underrep-*
6 *resented minorities in such programs and activities.*

7 (e) *RESPONSIBILITIES OF OSTP.—The Director of the*
8 *Office of Science and Technology Policy shall encourage and*
9 *monitor the efforts of the participating agencies to ensure*
10 *that the strategic plan under subsection (d)(2) is developed*
11 *and executed effectively and that the objectives of the stra-*
12 *tegic plan are met.*

13 (f) *REPORT.—The Director of the Office of Science and*
14 *Technology Policy shall transmit a report annually to Con-*
15 *gress at the time of the President’s budget request describing*
16 *the plan required under subsection (d)(2). The annual re-*
17 *port shall include—*

18 (1) *a description of the STEM education pro-*
19 *grams and activities for the previous and current fis-*
20 *cal years, and the proposed programs and activities*
21 *under the President’s budget request, of each partici-*
22 *pating Federal agency;*

23 (2) *the levels of funding for each participating*
24 *Federal agency for the programs and activities de-*

1 scribed under paragraph (1) for the previous fiscal
2 year and under the President's budget request;

3 (3) except for the initial annual report, a de-
4 scription of the progress made in carrying out the im-
5 plementation plan, including a description of the out-
6 come of any program assessments completed in the
7 previous year, and any changes made to that plan
8 since the previous annual report; and

9 (4) a description of how the participating Fed-
10 eral agencies will disseminate information about fed-
11 erally supported resources for STEM education prac-
12 titioners, including teacher professional development
13 programs, to States and to STEM education practi-
14 tioners, including to teachers and administrators in
15 high-need schools, as defined in section 200 of the
16 Higher Education Act of 1965 (20 U.S.C. 1021).

17 **SEC. 302. ADVISORY COMMITTEE ON STEM EDUCATION.**

18 (a) *IN GENERAL.*—The President shall establish or des-
19 ignate an advisory committee on science, technology, engi-
20 neering, and mathematics (STEM) education.

21 (b) *MEMBERSHIP.*—The advisory committee estab-
22 lished or designated by the President under subsection (a)
23 shall be chaired by at least 2 members of the President's
24 Council of Advisors on Science and Technology, with the
25 remaining advisory committee membership consisting of

1 *non-Federal members who are specially qualified to provide*
2 *the President with advice and information on STEM edu-*
3 *cation. Membership of the advisory committee, at a min-*
4 *imum, shall include individuals from the following cat-*
5 *egories of individuals and organizations:*

6 (1) *STEM educator professional associations.*

7 (2) *Organizations that provide informal STEM*
8 *education activities.*

9 (3) *Institutions of higher education.*

10 (4) *Scientific and engineering professional soci-*
11 *eties.*

12 (5) *Business and industry associations.*

13 (6) *Foundations that fund STEM education ac-*
14 *tivities.*

15 (c) *RESPONSIBILITIES.—The responsibilities of the ad-*
16 *visory committee shall include—*

17 (1) *soliciting input from teachers, administra-*
18 *tors, local education agencies, States, and other public*
19 *and private STEM education stakeholder groups for*
20 *the purpose of informing the Federal agencies that*
21 *support STEM education programs on the STEM*
22 *education needs of States and school districts;*

23 (2) *soliciting input from all STEM education*
24 *stakeholder groups regarding STEM education pro-*

grams, including STEM education research programs,
supported by Federal agencies;

(3) providing advice to the Federal agencies that
support STEM education programs on how their pro-
grams can be better aligned with the needs of States
and school districts as identified in paragraph (1),
consistent with the mission of each agency; and

(4) offering guidance to the President on current
STEM education activities, research findings, and
best practices, with the purpose of increasing
connectivity between public and private STEM edu-
cation efforts.

**SEC. 303. STEM EDUCATION AT THE DEPARTMENT OF EN-
ERGY.**

(a) *DEFINITIONS.*—Section 5002 of the America COM-
PETES Act (42 U.S.C. 16531) is amended—

(1) by redesignating paragraphs (2) through (4)
as paragraphs (3) through (5), respectively; and

(2) by inserting after paragraph (1) the fol-
lowing new paragraph:

“(2) *ENERGY SYSTEMS SCIENCE AND ENGINEER-
ING.*—The term ‘energy systems science and engineer-
ing’ means—

“(A) nuclear science and engineering, in-
cluding—

1 “(i) nuclear engineering;

2 “(ii) nuclear chemistry;

3 “(iii) radiochemistry; and

4 “(iv) health physics;

5 “(B) hydrocarbon system science and engi-
6 neering, including—

7 “(i) petroleum or reservoir engineering;

8 “(ii) environmental geoscience;

9 “(iii) petrophysics;

10 “(iv) geophysics;

11 “(v) geochemistry;

12 “(vi) petroleum geology;

13 “(vii) ocean engineering;

14 “(viii) environmental engineering; and

15 “(ix) carbon capture and sequestration
16 science and engineering;

17 “(C) energy efficiency and renewable energy
18 technology systems science and engineering, in-
19 cluding with respect to—

20 “(i) solar technology systems;

21 “(ii) wind technology systems;

22 “(iii) buildings technology systems;

23 “(iv) transportation technology sys-
24 tems;

25 “(v) hydropower systems; and

1 “(vi) *geothermal systems; and*

2 “(D) *energy storage and distribution sys-*
3 *tems science and engineering, including with re-*
4 *spect to—*

5 “(i) *energy storage; and*

6 “(ii) *energy delivery.*”.

7 (b) *SCIENCE, TECHNOLOGY, ENGINEERING, AND*
8 *MATHEMATICS EDUCATION PROGRAMS.—Subpart B of the*
9 *Department of Energy Science Education Enhancement*
10 *Act (42 U.S.C. 7381g et seq.) is amended—*

11 (1) *in section 3170—*

12 (A) *by amending paragraph (1) to read as*
13 *follows:*

14 “(1) *DIRECTOR.—The term ‘Director’ means the*
15 *Director of STEM Education appointed or designated*
16 *under section 3171(c)(1).’;*

17 (B) *by redesignating paragraph (2) as*
18 *paragraph (3);*

19 (C) *by inserting after paragraph (1) the fol-*
20 *lowing new paragraph:*

21 “(2) *ENERGY SYSTEMS SCIENCE AND ENGINEER-*
22 *ING.—The term ‘energy systems science and engineer-*
23 *ing’ means—*

24 “(A) *nuclear science and engineering, in-*
25 *cluding—*

1 “(i) nuclear engineering;

2 “(ii) nuclear chemistry;

3 “(iii) radiochemistry; and

4 “(iv) health physics;

5 “(B) hydrocarbon system science and engi-
6 neering, including—

7 “(i) petroleum or reservoir engineering;

8 “(ii) environmental geoscience;

9 “(iii) petrophysics;

10 “(iv) geophysics;

11 “(v) geochemistry;

12 “(vi) petroleum geology;

13 “(vii) ocean engineering; and

14 “(viii) environmental engineering;

15 “(C) energy efficiency and renewable energy
16 technology systems science and engineering, in-
17 cluding with respect to—

18 “(i) solar technology systems;

19 “(ii) wind technology systems;

20 “(iii) buildings technology systems;

21 “(iv) transportation technology sys-
22 tems;

23 “(v) hydropower systems; and

24 “(vi) geothermal systems; and

1 “(D) *energy storage and distribution sys-*
 2 *tems science and engineering, including with re-*
 3 *spect to—*

4 “(i) *energy storage; and*

5 “(ii) *energy delivery.*”; and

6 (D) *by adding at the end the following new*
 7 *paragraph:*

8 “(4) *STEM.—The term ‘STEM’ means science,*
 9 *technology, engineering, and mathematics.*”;

10 (2) *by striking chapters 1, 2, 3, 4, and 6;*

11 (3) *by inserting after section 3170 the following*
 12 *new chapter:*

13 **“CHAPTER 1—STEM EDUCATION**

14 **“SEC. 3171. STEM EDUCATION.**

15 “(a) *IN GENERAL.—The Secretary of Energy shall de-*
 16 *velop, conduct, support, promote, and coordinate formal*
 17 *and informal educational activities that leverage the De-*
 18 *partment’s unique content expertise and facilities to con-*
 19 *tribute to improving STEM education at all levels in the*
 20 *United States, and to enhance awareness and under-*
 21 *standing of STEM, including energy sciences, in order to*
 22 *create a diverse skilled scientific and technical workforce es-*
 23 *sential to meeting the challenges facing the Department and*
 24 *the Nation in the 21st century.*

1 “(b) *PROGRAMS.*—*The Secretary shall carry out evi-*
2 *dence-based programs designed to increase student interest*
3 *and participation, improve public literacy and support,*
4 *and improve the teaching and learning of energy systems*
5 *science and engineering and other STEM disciplines sup-*
6 *ported by the Department. Programs authorized under this*
7 *subsection may include—*

8 “(1) *informal educational programming designed*
9 *to excite and inspire students and the general public*
10 *about energy systems science and engineering and*
11 *other STEM disciplines supported by the Department,*
12 *while strengthening their content knowledge in these*
13 *fields;*

14 “(2) *teacher training and professional develop-*
15 *ment opportunities for pre-service and in-service ele-*
16 *mentary and secondary teachers designed to increase*
17 *the content knowledge of teachers in energy systems*
18 *science and engineering and other STEM disciplines*
19 *supported by the Department, including through*
20 *hands-on research experiences;*

21 “(3) *research opportunities for secondary school*
22 *students, including internships at the National Lab-*
23 *oratories, that provide secondary school students with*
24 *hands-on research experiences as well as exposure to*
25 *working scientists;*

1 “(4) *research opportunities at the National Lab-*
2 *oratories for undergraduate and graduate students*
3 *pursuing degrees in energy systems science and engi-*
4 *neering and other STEM disciplines supported by the*
5 *Department; and*

6 “(5) *competitive scholarships, fellowships, and*
7 *traineeships for undergraduate and graduate students*
8 *in energy systems science and engineering and other*
9 *STEM disciplines supported by the Department.*

10 “(c) *ORGANIZATION OF STEM EDUCATION PRO-*
11 *GRAMS.—*

12 “(1) *DIRECTOR OF STEM EDUCATION.—The Sec-*
13 *retary shall appoint or designate a Director of STEM*
14 *Education, who shall have the principal responsi-*
15 *bility to oversee and coordinate all programs and ac-*
16 *tivities of the Department in support of STEM edu-*
17 *cation, including energy systems science and engi-*
18 *neering education, across all functions of the Depart-*
19 *ment.*

20 “(2) *QUALIFICATIONS.—The Director shall be an*
21 *individual, who by reason of professional background*
22 *and experience, is specially qualified to advise the*
23 *Secretary on all matters pertaining to STEM edu-*
24 *cation, including energy systems science and engi-*
25 *neering education, at the Department.*

1 “(3) *DUTIES.—The Director shall—*

2 “(A) *oversee and coordinate all programs in*
3 *support of STEM education, including energy*
4 *systems science and engineering education,*
5 *across all functions of the Department;*

6 “(B) *represent the Department as the prin-*
7 *cipal interagency liaison for all STEM edu-*
8 *cation programs, unless otherwise represented by*
9 *the Secretary, the Under Secretary for Science,*
10 *or the Under Secretary for Energy;*

11 “(C) *prepare the annual budget and advise*
12 *the Under Secretary for Science and the Under*
13 *Secretary for Energy on all budgetary issues for*
14 *STEM education, including energy systems*
15 *science and engineering education, relative to the*
16 *programs of the Department;*

17 “(D) *establish, periodically update, and*
18 *maintain a publicly accessible online inventory*
19 *of STEM education programs and activities, in-*
20 *cluding energy systems science and engineering*
21 *education programs and activities;*

22 “(E) *develop, implement, and update the*
23 *Department of Energy STEM education stra-*
24 *tegic plan, as required by subsection (d);*

1 “(F) increase, to the maximum extent prac-
 2 ticable, the participation and advancement of
 3 women and underrepresented minorities at every
 4 level of STEM education, including energy sys-
 5 tems science and engineering education; and

6 “(G) perform such other matters relating to
 7 STEM education as are required by the Sec-
 8 retary, the Under Secretary for Science, or the
 9 Under Secretary for Energy.

10 “(d) DEPARTMENT OF ENERGY STEM EDUCATION
 11 STRATEGIC PLAN.—The Director of STEM education ap-
 12 pointed or designated under subsection (c)(1) shall develop,
 13 implement, and update once every 3 years a 3-year STEM
 14 education strategic plan for the Department, which shall—

15 “(1) identify and prioritize annual and long-
 16 term STEM education goals and objectives for the De-
 17 partment that are aligned with the overall goals of the
 18 National Science and Technology Council Committee
 19 on STEM Education Strategic plan required under
 20 section 301(d)(2) of the STEM Education Coordina-
 21 tion Act of 2010;

22 “(2) describe the role of each program or activity
 23 of the Department in contributing to the goals and
 24 objectives identified under paragraph (1);

1 “(3) *specify the metrics that will be used to as-*
 2 *sess progress toward achieving those goals and objec-*
 3 *tives; and*

4 “(4) *describe the approaches that will be taken to*
 5 *assess the effectiveness of each STEM education pro-*
 6 *gram and activity supported by the Department.*

7 “(e) *OUTREACH TO STUDENTS FROM UNDERREP-*
 8 *RESENTED GROUPS.—In carrying out a program author-*
 9 *ized under this section, the Secretary shall give consider-*
 10 *ation to the goal of promoting the participation of individ-*
 11 *uals identified in section 33 or 34 of the Science and Engi-*
 12 *neering Equal Opportunities Act (42 U.S.C. 1885a or*
 13 *1885b).*

14 “(f) *CONSULTATION AND PARTNERSHIP WITH OTHER*
 15 *AGENCIES.—In carrying out the programs and activities*
 16 *authorized under this section, the Secretary shall—*

17 “(1) *consult with the Secretary of Education and*
 18 *the Director of the National Science Foundation re-*
 19 *garding activities designed to improve elementary*
 20 *and secondary STEM education; and*

21 “(2) *consult and partner with the Director of the*
 22 *National Science Foundation in carrying out pro-*
 23 *grams under this section designed to build capacity*
 24 *in STEM education at the undergraduate and grad-*
 25 *uate level, including by supporting excellent proposals*

1 *in energy systems science and engineering that are*
 2 *submitted for funding to the Foundation’s Advanced*
 3 *Technological Education Program.”; and*

4 *(4) in section 3191—*

5 *(A) in subsection (a)—*

6 *(i) by striking “web-based” and insert-*
 7 *ing “, through a publicly available website,”*
 8 *; and*

9 *(ii) by inserting “and project-based*
 10 *learning opportunities” after “laboratory*
 11 *experiments”;*

12 *(B) in subsection (b)(1), by inserting “, in-*
 13 *cluding energy systems science and engineering”*
 14 *after “the science of energy”; and*

15 *(C) by striking subsection (d).*

16 *(c) ENERGY APPLIED SCIENCE TALENT EXPANSION*
 17 *PROGRAM FOR INSTITUTIONS OF HIGHER EDUCATION.—*

18 *(1) AMENDMENT.—Strike sections 5004 and*
 19 *5005 of the America COMPETES Act (42 U.S.C.*
 20 *16532 and 16533) and insert the following new sec-*
 21 *tion:*

22 **“SEC. 5004. ENERGY APPLIED SCIENCE TALENT EXPANSION**
 23 **PROGRAM FOR INSTITUTIONS OF HIGHER**
 24 **EDUCATION.**

25 *“(a) PURPOSES.—The purposes of this section are—*

1 “(1) to address the decline in the number of and
2 resources available to energy systems science and en-
3 gineering programs at institutions of higher edu-
4 cation, including community colleges; and

5 “(2) to increase the number of graduates with
6 degrees in energy systems science and engineering, an
7 area of strategic importance to the economic competi-
8 tiveness and energy security of the United States.

9 “(b) *ESTABLISHMENT*.—The Secretary shall award
10 grants, on a competitive, merit-reviewed basis, to institu-
11 tions of higher education to implement or expand the energy
12 systems science and engineering educational and technical
13 training capabilities of the institution, and to provide
14 merit-based financial support for master’s and doctoral
15 level students pursuing courses of study and research in en-
16 ergy systems sciences and engineering.

17 “(c) *USE OF FUNDS*.—An institution of higher edu-
18 cation that receives a grant under this section may use the
19 grant to—

20 “(1) provide traineeships, including stipends and
21 cost of education allowances, to master’s and doctoral
22 students;

23 “(2) develop or expand multidisciplinary or
24 interdisciplinary courses or programs;

25 “(3) recruit and retain new faculty;

1 “(4) develop or improve core and specialized
2 course content;

3 “(5) encourage interdisciplinary and multidisci-
4 plinary research collaborations;

5 “(6) support outreach efforts to recruit students,
6 including individuals identified in section 33 or 34
7 of the Science and Engineering Equal Opportunities
8 Act (42 U.S.C. 1885a or 1885b); and

9 “(7) pursue opportunities for collaboration with
10 industry and National Laboratories.

11 “(d) *CRITERIA.*—Criteria for awarding a grant under
12 this section shall be based on—

13 “(1) the potential to attract new students to the
14 program;

15 “(2) academic rigor; and

16 “(3) the ability to offer hands-on education and
17 training opportunities for graduate students in the
18 emerging areas of energy systems science and engi-
19 neering.

20 “(e) *PRIORITY.*—The Secretary shall give priority to
21 proposals that involve active partnerships with a National
22 Laboratory or other energy systems science and engineering
23 related entity, as determined by the Secretary.

24 “(f) *DURATION AND AMOUNT.*—

1 “(1) *DURATION*.—A grant under this section
2 may be for up to 5 years in duration.

3 “(2) *AMOUNT*.—An institution of higher edu-
4 cation that receives a grant under this section shall
5 be eligible for up to \$1,000,000 for each year of the
6 grant period.

7 “(g) *AUTHORIZATION OF APPROPRIATIONS*.—There
8 are authorized to be appropriated to the Secretary to carry
9 out this section—

10 “(1) \$30,000,000 for fiscal year 2011;

11 “(2) \$32,000,000 for fiscal year 2012;

12 “(3) \$36,000,000 for fiscal year 2013;

13 “(4) \$38,000,000 for fiscal year 2014; and

14 “(5) \$40,000,000 for fiscal year 2015.”.

15 (2) *CONFORMING AMENDMENT*.—The table of
16 contents for the America *COMPETES* Act is amended
17 by striking the items relating to sections 5004 and
18 5005 and inserting the following:

*Sec. 5004. Energy applied science talent expansion program for institutions of
higher education.*

19 (d) *DEPARTMENT OF ENERGY EARLY CAREER*
20 *AWARDS FOR SCIENCE, ENGINEERING, AND MATHEMATICS*
21 *RESEARCHERS*.—Section 5006 of the America *COMPETES*
22 Act (42 U.S.C. 16534) is amended—

1 (1) in subsection (a), by striking “Director of the
2 Office” and all that follows through “shall carry” and
3 inserting “Secretary shall carry”;

4 (2) in subsection (b)(1)—

5 (A) in subparagraph (A), by inserting “per
6 year” after “\$80,000”; and

7 (B) in subparagraph (B), by striking
8 “\$125,000” and inserting “\$175,000 per year”;

9 (3) in subsection (c)(1), by striking “, as deter-
10 mined by the Director”;

11 (4) in subsections (c)(2), (e), (f), and (g), by
12 striking “Director” each place it appears and insert-
13 ing “Secretary”;

14 (5) in subsection (d), by striking “merit-re-
15 viewed” and inserting “merit-based, peer reviewed”;
16 and

17 (6) in subsection (h)—

18 (A) by striking “, acting through the Direc-
19 tor,”; and

20 (B) by striking “\$25,000,000 for each of fis-
21 cal years 2008 through 2010” and inserting
22 “such sums as are necessary”.

23 (e) *PROTECTING AMERICA’S COMPETITIVE EDGE*
24 *(PACE) GRADUATE FELLOWSHIP PROGRAM.—Section*

1 *5009 of the America COMPETES Act (42 U.S.C. 16536)*
 2 *is amended—*

3 *(1) in subsection (c)—*

4 *(A) in paragraph (1), by striking “involv-*
 5 *ing written and oral interviews, that will result*
 6 *in a wide distribution of awards throughout the*
 7 *United States,”; and*

8 *(B) in paragraph (2)(B)(iv), by striking*
 9 *“verbal and”;*

10 *(2) in subsection (d)(1)(B)(i), by inserting “par-*
 11 *tial or full” before “graduate tuition”; and*

12 *(3) by striking subsection (f).*

13 *(f) REPEAL.—Section 3164 of the Department of En-*
 14 *ergy Science Education Enhancement Act (42 U.S.C.*
 15 *7381a) is repealed.*

16 **SEC. 304. GREEN ENERGY EDUCATION.**

17 *(a) SHORT TITLE.—This section may be cited as the*
 18 *“Green Energy Education Act of 2010”.*

19 *(b) DEFINITION.—For the purposes of this section:*

20 *(1) DIRECTOR.—The term “Director” means the*
 21 *Director of the National Science Foundation.*

22 *(2) HIGH PERFORMANCE BUILDING.—The term*
 23 *“high performance building” has the meaning given*
 24 *that term in section 914(a) of the Energy Policy Act*
 25 *of 2005 (42 U.S.C. 16194(a)).*

1 (c) *GRADUATE TRAINING IN ENERGY RESEARCH AND*
2 *DEVELOPMENT.*—

3 (1) *FUNDING.*—*In carrying out research, devel-*
4 *opment, demonstration, and commercial application*
5 *activities authorized for the Department of Energy,*
6 *the Secretary may contribute funds to the National*
7 *Science Foundation for the Integrative Graduate*
8 *Education and Research Traineeship program to sup-*
9 *port projects that enable graduate education related to*
10 *such activities.*

11 (2) *CONSULTATION.*—*The Director shall consult*
12 *with the Secretary when preparing solicitations and*
13 *awarding grants for projects described in paragraph*
14 *(1).*

15 (d) *CURRICULUM DEVELOPMENT FOR HIGH PER-*
16 *FORMANCE BUILDING DESIGN.*—

17 (1) *FUNDING.*—*In carrying out advanced energy*
18 *technology research, development, demonstration, and*
19 *commercial application activities authorized for the*
20 *Department of Energy related to high performance*
21 *buildings, the Secretary may contribute funds to cur-*
22 *riculum development activities at the National*
23 *Science Foundation for the purpose of improving un-*
24 *dergraduate or graduate interdisciplinary engineering*
25 *and architecture education related to the design and*

1 *construction of high performance buildings, including*
2 *development of curricula, of laboratory activities, of*
3 *training practicums, or of design projects. A primary*
4 *goal of curriculum development activities supported*
5 *under this subsection shall be to improve the ability*
6 *of engineers, architects, landscape architects, and*
7 *planners to work together on the incorporation of ad-*
8 *vanced energy technologies during the design and con-*
9 *struction of high performance buildings.*

10 (2) *CONSULTATION.*—*The Director shall consult*
11 *with the Secretary when preparing solicitations and*
12 *awarding grants for projects described in paragraph*
13 *(1).*

14 (3) *PRIORITY.*—*In awarding grants with respect*
15 *to which the Secretary has contributed funds under*
16 *this subsection, the Director shall give priority to ap-*
17 *plications from departments, programs, or centers of*
18 *a school of engineering that are partnered with*
19 *schools, departments, or programs of design, architec-*
20 *ture, landscape architecture, and city, regional, or*
21 *urban planning.*

1 **TITLE IV—NATIONAL INSTITUTE**
2 **OF STANDARDS AND TECH-**
3 **NOLOGY**

4 **SEC. 401. SHORT TITLE.**

5 *This title may be cited as the “National Institute of*
6 *Standards and Technology Authorization Act of 2010”.*

7 **SEC. 402. AUTHORIZATION OF APPROPRIATIONS.**

8 *(a) FISCAL YEAR 2011.—*

9 *(1) IN GENERAL.—There are authorized to be ap-*
10 *propriated to the Secretary of Commerce*
11 *\$991,100,000 for the National Institute of Standards*
12 *and Technology for fiscal year 2011.*

13 *(2) SPECIFIC ALLOCATIONS.—Of the amount au-*
14 *thorized under paragraph (1)—*

15 *(A) \$620,000,000 shall be authorized for sci-*
16 *entific and technical research and services lab-*
17 *oratory activities;*

18 *(B) \$125,000,000 shall be authorized for the*
19 *construction and maintenance of facilities; and*

20 *(C) \$246,100,000 shall be authorized for in-*
21 *dustrial technology services activities, of which—*

22 *(i) \$95,000,000 shall be authorized for*
23 *the Technology Innovation Program under*
24 *section 28 of the National Institute of*

1 *Standards and Technology Act (15 U.S.C.*
 2 *278n);*

3 (ii) *\$141,100,000 shall be authorized*
 4 *for the Manufacturing Extension Partner-*
 5 *ship program under sections 25 and 26 of*
 6 *such Act (15 U.S.C. 278k and 278l); and*

7 (iii) *\$10,000,000 shall be authorized*
 8 *for the Malcolm Baldrige National Quality*
 9 *Award program under section 17 of the Ste-*
 10 *venson-Wyidler Technology Innovation Act*
 11 *of 1980 (15 U.S.C. 3711a).*

12 (b) *FISCAL YEAR 2012.—*

13 (1) *IN GENERAL.—There are authorized to be ap-*
 14 *propriated to the Secretary of Commerce*
 15 *\$992,400,000 for the National Institute of Standards*
 16 *and Technology for fiscal year 2012.*

17 (2) *SPECIFIC ALLOCATIONS.—Of the amount au-*
 18 *thorized under paragraph (1)—*

19 (A) *\$657,200,000 shall be authorized for sci-*
 20 *entific and technical research and services lab-*
 21 *oratory activities;*

22 (B) *\$85,000,000 shall be authorized for the*
 23 *construction and maintenance of facilities; and*

24 (C) *\$250,200,000 shall be authorized for in-*
 25 *dustrial technology services activities, of which—*

1 (i) \$89,000,000 shall be authorized for
 2 the Technology Innovation Program under
 3 section 28 of the National Institute of
 4 Standards and Technology Act (15 U.S.C.
 5 278n);

6 (ii) \$150,900,000 shall be authorized
 7 for the Manufacturing Extension Partner-
 8 ship program under sections 25 and 26 of
 9 such Act (15 U.S.C. 278k and 278l); and

10 (iii) \$10,300,000 shall be authorized
 11 for the Malcolm Baldrige National Quality
 12 Award program under section 17 of the Ste-
 13 venson-Wydler Technology Innovation Act
 14 of 1980 (15 U.S.C. 3711a).

15 (c) *FISCAL YEAR 2013.*—

16 (1) *IN GENERAL.*—There are authorized to be ap-
 17 propriated to the Secretary of Commerce
 18 \$1,079,809,000 for the National Institute of Stand-
 19 ards and Technology for fiscal year 2013.

20 (2) *SPECIFIC ALLOCATIONS.*—Of the amount au-
 21 thorized under paragraph (1)—

22 (A) \$696,700,000 shall be authorized for sci-
 23 entific and technical research and services lab-
 24 oratory activities;

1 (B) \$122,000,000 shall be authorized for the
2 construction and maintenance of facilities; and

3 (C) \$261,109,000 shall be authorized for in-
4 dustrial technology services activities, of which—

5 (i) \$89,000,000 shall be authorized for
6 the Technology Innovation Program under
7 section 28 of the National Institute of
8 Standards and Technology Act (15 U.S.C.
9 278n);

10 (ii) \$161,500,000 shall be authorized
11 for the Manufacturing Extension Partner-
12 ship program under sections 25 and 26 of
13 such Act (15 U.S.C. 278k and 278l); and

14 (iii) \$10,609,000 shall be authorized
15 for the Malcolm Baldrige National Quality
16 Award program under section 17 of the Ste-
17 venson-Wynder Technology Innovation Act
18 of 1980 (15 U.S.C. 3711a).

19 (d) *FISCAL YEAR 2014.*—

20 (1) *IN GENERAL.*—There are authorized to be ap-
21 propriated to the Secretary of Commerce
22 \$1,126,227,000 for the National Institute of Stand-
23 ards and Technology for fiscal year 2014.

24 (2) *SPECIFIC ALLOCATIONS.*—Of the amount au-
25 thorized under paragraph (1)—

1 (A) \$738,500,000 shall be authorized for sci-
2 entific and technical research and services lab-
3 oratory activities;

4 (B) \$124,000,000 shall be authorized for the
5 construction and maintenance of facilities; and

6 (C) \$263,727,000 shall be authorized for in-
7 dustrial technology services activities, of which—

8 (i) \$80,000,000 shall be authorized for
9 the Technology Innovation Program under
10 section 28 of the National Institute of
11 Standards and Technology Act (15 U.S.C.
12 278n);

13 (ii) \$172,800,000 shall be authorized
14 for the Manufacturing Extension Partner-
15 ship program under sections 25 and 26 of
16 such Act (15 U.S.C. 278k and 278l); and

17 (iii) \$10,927,000 shall be authorized
18 for the Malcolm Baldrige National Quality
19 Award program under section 17 of the Ste-
20 venson-Wylder Technology Innovation Act
21 of 1980 (15 U.S.C. 3711a).

22 (e) FISCAL YEAR 2015.—

23 (1) IN GENERAL.—There are authorized to be ap-
24 propriated to the Secretary of Commerce

1 \$1,191,955,000 for the National Institute of Stand-
2 ards and Technology for fiscal year 2015.

3 (2) *SPECIFIC ALLOCATIONS.*—Of the amount au-
4 thorized under paragraph (1)—

5 (A) \$782,800,000 shall be authorized for sci-
6 entific and technical research and services lab-
7 oratory activities;

8 (B) \$133,000,000 shall be authorized for the
9 construction and maintenance of facilities; and

10 (C) \$276,155,000 shall be authorized for in-
11 dustrial technology services activities, of which—

12 (i) \$80,000,000 shall be authorized for
13 the Technology Innovation Program under
14 section 28 of the National Institute of
15 Standards and Technology Act (15 U.S.C.
16 278n);

17 (ii) \$184,900,000 shall be authorized
18 for the Manufacturing Extension Partner-
19 ship program under sections 25 and 26 of
20 such Act (15 U.S.C. 278k and 278l); and

21 (iii) \$11,255,000 shall be authorized
22 for the Malcolm Baldrige National Quality
23 Award program under section 17 of the Ste-
24 venson-Wylder Technology Innovation Act
25 of 1980 (15 U.S.C. 3711a).

1 **SEC. 403. UNDER SECRETARY OF COMMERCE FOR STAND-**
2 **ARDS AND TECHNOLOGY.**

3 (a) *ESTABLISHMENT.*—Section 4 of the National Insti-
4 tute of Standards and Technology Act is amended to read
5 as follows:

6 **“SEC. 4. UNDER SECRETARY OF COMMERCE FOR STAND-**
7 **ARDS AND TECHNOLOGY.**

8 “(a) *ESTABLISHMENT.*—There shall be in the Depart-
9 ment of Commerce an Under Secretary of Commerce for
10 Standards and Technology (in this section referred to as
11 the ‘Under Secretary’).

12 “(b) *APPOINTMENT.*—The Under Secretary shall be
13 appointed by the President by and with the advice and con-
14 sent of the Senate.

15 “(c) *COMPENSATION.*—The Under Secretary shall be
16 compensated at the rate in effect for level III of the Execu-
17 tive Schedule under section 5314 of title 5, United States
18 Code.

19 “(d) *DUTIES.*—The Under Secretary shall serve as the
20 Director of the Institute and shall perform such duties as
21 required of the Director by the Secretary under this Act
22 or by law.

23 “(e) *APPLICABILITY.*—The individual serving as the
24 Director of the Institute on the date of enactment of the
25 National Institute of Standards and Technology Authoriza-
26 tion Act of 2010 shall also serve as the Under Secretary

1 *until such time as a successor is appointed under subsection*
 2 *(b).”.*

3 *(b) CONFORMING AMENDMENTS.—*

4 *(1) TITLE 5, UNITED STATES CODE.—*

5 *(A) LEVEL III.—Section 5314 of title 5,*
 6 *United States Code, is amended by inserting be-*
 7 *fore the item “Associate Attorney General” the*
 8 *following:*

9 *“Under Secretary of Commerce for Standards*
 10 *and Technology, who also serves as Director of the*
 11 *National Institute of Standards and Technology.”.*

12 *(B) LEVEL IV.—Section 5315 of title 5,*
 13 *United States Code, is amended by striking “Di-*
 14 *rector, National Institute of Standards and*
 15 *Technology, Department of Commerce.”.*

16 *(2) NATIONAL INSTITUTE OF STANDARDS AND*
 17 *TECHNOLOGY ACT.—Section 5 of the National Insti-*
 18 *tute of Standards and Technology Act (15 U.S.C.*
 19 *274) is amended by striking the first, fifth, and sixth*
 20 *sentences.*

21 **SEC. 404. REORGANIZATION OF NIST LABORATORIES.**

22 *(a) ORGANIZATION.—The Director shall reorganize the*
 23 *scientific and technical research and services laboratory*
 24 *program into the following operational units:*

1 (1) *The Physical Measurement Laboratory,*
2 *whose mission is to realize and disseminate the na-*
3 *tional standards for length, mass, time and frequency,*
4 *electricity, temperature, force, and radiation by ac-*
5 *tivities including fundamental research in measure-*
6 *ment science, the provision of measurement services*
7 *and standards, and the provision of testing facilities*
8 *resources for use by the Federal Government.*

9 (2) *The Information Technology Laboratory,*
10 *whose mission is to develop and disseminate stand-*
11 *ards, measurements, and testing capabilities for inter-*
12 *operability, security, usability, and reliability of in-*
13 *formation technologies, including cyber security*
14 *standards and guidelines for Federal agencies, United*
15 *States industry, and the public, through fundamental*
16 *and applied research in computer science, mathe-*
17 *matics, and statistics.*

18 (3) *The Engineering Laboratory, whose mission*
19 *is to develop and disseminate advanced manufac-*
20 *turing and construction technologies to the United*
21 *States manufacturing and construction industries*
22 *through activities including measurement science re-*
23 *search, performance metrics, tools for engineering ap-*
24 *plications, and promotion of standards adoption.*

1 (4) *The Material Measurement Laboratory,*
2 *whose mission is to serve as the national reference*
3 *laboratory in biological, chemical, and material*
4 *sciences and engineering through activities including*
5 *fundamental research in the composition, structure,*
6 *and properties of biological and environmental mate-*
7 *rials and processes, the development of certified ref-*
8 *erence materials and critically evaluated data, and*
9 *other programs to assure measurement quality in ma-*
10 *terials and biotechnology fields.*

11 (5) *The Center for Nanoscale Science and Tech-*
12 *nology, a national shared-use facility for nanoscale*
13 *fabrication and measurement, whose mission is to de-*
14 *velop innovative nanoscale measurement and fabrica-*
15 *tion capabilities to support researchers from industry,*
16 *institutions of higher education, the National Insti-*
17 *tute of Standards and Technology, and other Federal*
18 *agencies in nanoscale technology from discovery to*
19 *production.*

20 (6) *The NIST Center for Neutron Research, a*
21 *national user facility, whose mission is to provide*
22 *neutron-based measurement capabilities to researchers*
23 *from industry, institutions of higher education, the*
24 *National Institute of Standards and Technology, and*
25 *other Federal agencies in support of materials re-*

1 *search, nondestructive evaluation, neutron imaging,*
2 *chemical analysis, neutron standards, dosimetry, and*
3 *radiation metrology.*

4 **(b) ADDITIONAL DUTIES.**—*The Director may assign*
5 *additional duties to the operational units listed in sub-*
6 *section (a) that are consistent with the missions of such*
7 *units.*

8 **(c) REVISION.**—

9 **(1) IN GENERAL.**—*Subsequent to the reorganiza-*
10 *tion required under subsection (a), the Director may*
11 *revise the organization of the scientific and technical*
12 *research and services laboratory program.*

13 **(2) REPORT TO CONGRESS.**—*Any revision to the*
14 *organization of such program under paragraph (1)*
15 *shall be submitted in a report to the Committee on*
16 *Science and Technology of the House of Representa-*
17 *tives and the Committee on Commerce, Science, and*
18 *Transportation of the Senate at least 60 days before*
19 *the effective date of such revision.*

20 **SEC. 405. FEDERAL GOVERNMENT STANDARDS AND CON-**
21 **FORMITY ASSESSMENT COORDINATION.**

22 **(a) COORDINATION.**—*Section 2(b) of the National In-*
23 *stitute of Standards and Technology Act (15 U.S.C. 272(b))*
24 *is amended—*

1 (1) in paragraph (12), by striking “and” after
2 the semicolon;

3 (2) in paragraph (13), by striking the period at
4 the end and inserting a semicolon; and

5 (3) by adding after paragraph (13) the fol-
6 lowing:

7 “(14) to promote collaboration among Federal
8 departments and agencies and private sector stake-
9 holders in the development and implementation of
10 standards and conformity assessment frameworks to
11 address specific Federal Government policy goals; and

12 “(15) to convene Federal departments and agen-
13 cies, as appropriate, to—

14 “(A) coordinate and determine Federal Gov-
15 ernment positions on specific policy issues re-
16 lated to the development of international tech-
17 nical standards and conformity assessment-re-
18 lated activities; and

19 “(B) coordinate Federal department and
20 agency engagement in the development of inter-
21 national technical standards and conformity as-
22 sessment-related activities.”.

23 (b) *REPORT.*—The Director, in consultation with ap-
24 propriate Federal agencies, shall submit a report annually
25 to Congress addressing the Federal Government’s technical

1 *standards and conformity assessment-related activities. The*
 2 *report shall identify—*

3 *(1) current and anticipated international stand-*
 4 *ards and conformity assessment-related issues that*
 5 *have the potential to impact the competitiveness and*
 6 *innovation capabilities of the United States;*

7 *(2) any action being taken by the Federal Gov-*
 8 *ernment to address these issues and the Federal agen-*
 9 *cy taking that action; and*

10 *(3) any action that the Director is taking or will*
 11 *take to ensure effective Federal Government engage-*
 12 *ment on technical standards and conformity assess-*
 13 *ment-related issues, as appropriate, where the Federal*
 14 *Government is not effectively engaged.*

15 **SEC. 406. MANUFACTURING EXTENSION PARTNERSHIP.**

16 *(a) COMMUNITY COLLEGE SUPPORT.—Section 25(a) of*
 17 *the National Institute of Standards and Technology Act (15*
 18 *U.S.C. 278k(a)) is amended—*

19 *(1) in paragraph (4), by striking “and” after the*
 20 *semicolon;*

21 *(2) in paragraph (5), by striking the period at*
 22 *the end and inserting “; and”; and*

23 *(3) by adding after paragraph (5) the following:*

24 *“(6) providing to community colleges informa-*
 25 *tion about the job skills needed in small- and me-*

1 *dium-sized manufacturing businesses in the regions*
 2 *they serve.”.*

3 *(b) INNOVATIVE SERVICES INITIATIVE.—Section 25 of*
 4 *such Act (15 U.S.C. 278k) is amended by adding at the*
 5 *end the following:*

6 *“(g) INNOVATIVE SERVICES INITIATIVE.—*

7 *“(1) ESTABLISHMENT.—The Director may estab-*
 8 *lish, within the Centers program under this section,*
 9 *an innovative services initiative to assist small- and*
 10 *medium-sized manufacturers in—*

11 *“(A) reducing their energy usage and envi-*
 12 *ronmental waste to improve profitability; and*

13 *“(B) accelerating the domestic commer-*
 14 *cialization of new product technologies, includ-*
 15 *ing components for renewable energy systems.*

16 *“(2) MARKET DEMAND.—The Director may not*
 17 *undertake any activity to accelerate the domestic com-*
 18 *mercialization of a new product technology under this*
 19 *subsection unless an analysis of market demand for*
 20 *the new product technology has been conducted.”.*

21 *(c) REPORTS.—Section 25 of such Act (15 U.S.C.*
 22 *278k) is further amended by adding after subsection (g),*
 23 *as added by subsection (b), the following:*

24 *“(h) REPORTS.—*

1 “(1) *IN GENERAL.*—*In submitting the 3-year*
 2 *programmatic planning document and annual up-*
 3 *dates under section 23, the Director shall include an*
 4 *assessment of the Director’s governance of the pro-*
 5 *gram established under this section.*

6 “(2) *CRITERIA.*—*In conducting such assessment,*
 7 *the Director shall use the criteria established pursu-*
 8 *ant to the Malcolm Baldrige National Quality Award*
 9 *under section 17(d)(1)(C) of the Stevenson-Wydler*
 10 *Technology Innovation Act of 1980 (15 U.S.C.*
 11 *3711a(d)(1)(C)).”.*

12 *(d) HOLLINGS MANUFACTURING EXTENSION PART-*
 13 *nership Program Cost-Sharing.*—*Section 25(c) of such*
 14 *Act (15 U.S.C. 278k(c)) is amended by adding at the end*
 15 *the following:*

16 “(7) *Notwithstanding paragraphs (1), (3), and*
 17 *(5), for fiscal year 2011 through fiscal year 2015, the*
 18 *Secretary may not provide to a Center more than 50*
 19 *percent of the costs incurred by such Center and may*
 20 *not require that a Center’s cost share exceed 50 per-*
 21 *cent.*

22 “(8) *Not later than 4 years after the date of en-*
 23 *actment of the National Institute of Standards and*
 24 *Technology Authorization Act of 2010, the Secretary*

1 *shall submit to Congress a report on the cost share re-*
 2 *quirements under the program. The report shall—*

3 “(A) *discuss various cost share structures,*
 4 *including the cost share structure in place prior*
 5 *to such date of enactment and the cost share*
 6 *structure in place under paragraph (7), and the*
 7 *effect of such cost share structures on individual*
 8 *Centers and the overall program; and*

9 “(B) *include a recommendation for how best*
 10 *to structure the cost share requirement after fis-*
 11 *cal year 2015 to provide for the long-term sus-*
 12 *tainability of the program.”.*

13 (e) *ADVISORY BOARD.—Section 25(e)(4) of such Act*
 14 *(15 U.S.C. 278k(e)(4)) is amended to read as follows:*

15 “(4) *FEDERAL ADVISORY COMMITTEE ACT APPLI-*
 16 *CABILITY.—*

17 “(A) *IN GENERAL.—In discharging its du-*
 18 *ties under this subsection, the MEP Advisory*
 19 *Board shall function solely in an advisory ca-*
 20 *capacity, in accordance with the Federal Advisory*
 21 *Committee Act.*

22 “(B) *EXCEPTION.—Section 14 of the Fed-*
 23 *eral Advisory Committee Act shall not apply to*
 24 *the MEP Advisory Board.”.*

1 (f) *DEFINITIONS.*—Section 25 of such Act (15 U.S.C.
 2 278k) is further amended by adding after subsection (h),
 3 as added by subsection (c), the following:

4 “(i) *DEFINITION.*—In this section, the term ‘commu-
 5 nity college’ means an institution of higher education (as
 6 defined under section 101(a) of the Higher Education Act
 7 of 1965 (20 U.S.C. 1001(a))) at which the highest degree
 8 that is predominately awarded to students is an associate’s
 9 degree.”.

10 **SEC. 407. BIOSCIENCE RESEARCH PROGRAM.**

11 (a) *IN GENERAL.*—The National Institute of Stand-
 12 ards and Technology Act (15 U.S.C. 271 et seq.) is amend-
 13 ed—

14 (1) by redesignating section 34 as section 35;
 15 and

16 (2) by inserting after section 33 the following:

17 **“SEC. 34. BIOSCIENCE RESEARCH PROGRAM.**

18 “(a) *IN GENERAL.*—The Director shall establish a bio-
 19 science research program to support research and develop-
 20 ment of standard reference materials, measurements, meth-
 21 ods, and genomic and other data to advance—

22 “(1) biological drug research and development;

23 “(2) molecular diagnostics;

24 “(3) medical imaging technologies; and

25 “(4) personalized medicine.

1 “(b) *UNIVERSITY RESEARCH CENTERS.*—

2 “(1) *ESTABLISHMENT.*—*The Director may estab-*
3 *lish research centers at institutions of higher edu-*
4 *cation (in this section referred to as ‘university re-*
5 *search centers’)* *through a competitive application*
6 *process to conduct research that furthers the objectives*
7 *of the bioscience research program.*

8 “(2) *APPLICATION.*—

9 “(A) *IN GENERAL.*—*An institution of higher*
10 *education seeking to establish a university re-*
11 *search center under this subsection shall submit*
12 *an application to the Director at such time, in*
13 *such manner, and containing such information*
14 *and assurances as the Director may require.*

15 “(B) *COMPONENTS.*—*The application shall*
16 *include, at a minimum, a description of—*

17 “(i) *the relevant research and instruc-*
18 *tional capacity of the applicant;*

19 “(ii) *the research projects that will be*
20 *undertaken by the applicant;*

21 “(iii) *the extent to which the applicant*
22 *will partner with industry and the role in-*
23 *dustry will play in the research undertaken*
24 *by the university research center;*

1 “(iv) *how the applicant will disseminate research results effectively; and*

2
3 “(v) *the metrics that will be used to evaluate the success of the projects under clause (ii) and the contribution of the university research center in furthering the objectives of the bioscience research program.*

4
5
6
7
8 “(C) *SPECIAL CONSIDERATION.—The Director shall give special consideration to an application from an institution of higher education that is—*

9
10
11
12 “(i) *an 1890 Institution, as defined in section 2 of the Agricultural Research, Extension, and Education Reform Act of 1998 (7 U.S.C. 7061);*

13
14
15
16 “(ii) *a Predominantly Black Institution, as defined in section 318 of the Higher Education Act of 1965 (20 U.S.C. 1059e);*

17
18
19 “(iii) *a part B institution, as defined in section 322 of the Higher Education Act of 1965 (20 U.S.C. 1061);*

20
21
22 “(iv) *a Tribal College or University, as defined in section 316 of the Higher Education Act of 1965 (20 U.S.C. 1059e);*

1 “(v) a Native American-serving, non-
2 tribal institution, as defined in section 319
3 of the Higher Education Act of 1965 (20
4 U.S.C. 1059f);

5 “(vi) an Asian American and Native
6 American Pacific Islander-serving institu-
7 tion, as defined in section 320 of the Higher
8 Education Act of 1965 (20 U.S.C. 1059g);

9 “(vii) an Alaska Native-serving insti-
10 tution, as defined in section 317 of the
11 Higher Education Act of 1965 (20 U.S.C.
12 1059d);

13 “(viii) a Native Hawaiian-serving in-
14 stitution, as defined in section 317 of the
15 Higher Education Act of 1965 (20 U.S.C.
16 1059d); or

17 “(ix) a Hispanic-serving institution,
18 as defined in section 502 of the Higher
19 Education Act of 1965 (20 U.S.C. 1101a).

20 “(3) ASSESSMENT.—Not later than 3 years after
21 the date on which a university research center is es-
22 tablished and every 3 years thereafter, the Director
23 shall evaluate the university research center for its
24 contributions to the bioscience research program.

1 “(4) *ANNUAL MEETING.*—If the Director estab-
2 lishes more than 1 university research center, the Di-
3 rector shall convene an annual meeting of researchers
4 from all of the university research centers and the In-
5 stitute to foster collaboration and communication.

6 “(c) *USER FACILITY.*—The Director may establish a
7 bioscience user facility to provide access to advanced or
8 unique equipment, services, materials, and other resources
9 to industry, institutions of higher education, nonprofit or-
10 ganizations, and government agencies to perform research
11 and testing.

12 “(d) *POSTDOCTORAL FELLOWS.*—The Director shall,
13 to the extent practicable, assign 1 or more fellows from the
14 postdoctoral fellowship program established in section 19 to
15 the bioscience research program.

16 “(e) *PROGRAMMATIC PLANNING DOCUMENT.*—The Di-
17 rector shall ensure that the updates to the programmatic
18 planning document transmitted to Congress under section
19 23(d) include the bioscience research program.

20 “(f) *DEFINITIONS.*—In this section:

21 “(1) *BIOSCIENCE RESEARCH PROGRAM.*—The
22 term ‘bioscience research program’ means the research
23 and development program authorized under sub-
24 section (a).

1 “(2) *INSTITUTION OF HIGHER EDUCATION*.—The
 2 term ‘institution of higher education’ has the same
 3 meaning given the term in section 101(a) of the *High-*
 4 *er Education Act of 1965* (20 U.S.C. 1001(a)).”.

5 (b) *VISITING COMMITTEE ON ADVANCED TECHNOLOGY*
 6 *AMENDMENTS*.—Section 10 of the *National Institute of*
 7 *Standards and Technology Act* (15 U.S.C. 278) is amend-
 8 *ed*—

9 (1) in subsection (a)—

10 (A) by striking “15 members” and inserting
 11 “at least 15, but not more than 20, members”;
 12 and

13 (B) by striking “at least 10” and inserting
 14 “at least 13”; and

15 (2) in subsection (h)(1), by striking “Program
 16 established under section 28” and inserting “pro-
 17 grams established under sections 28 and 34”.

18 **SEC. 408. EMERGENCY COMMUNICATION AND TRACKING**
 19 **TECHNOLOGIES RESEARCH INITIATIVE.**

20 (a) *ESTABLISHMENT*.—The Director shall establish a
 21 research initiative to support the development of emergency
 22 communication and tracking technologies for use in locat-
 23 ing trapped individuals in confined spaces, such as under-
 24 ground mines, and other shielded environments, such as

1 *high-rise buildings or collapsed structures, where conven-*
 2 *tional radio communication is limited.*

3 (b) *ACTIVITIES.*—*In order to carry out this section, the*
 4 *Director shall work with the private sector and appropriate*
 5 *Federal agencies to—*

6 (1) *perform a needs assessment to identify and*
 7 *evaluate the measurement, technical standards, and*
 8 *conformity assessment needs required to improve the*
 9 *operation and reliability of such emergency commu-*
 10 *nication and tracking technologies; and*

11 (2) *support the development of technical stand-*
 12 *ards and conformance architecture to improve the op-*
 13 *eration and reliability of such emergency communica-*
 14 *tion and tracking technologies.*

15 (c) *REPORT.*—*Not later than 18 months after the date*
 16 *of enactment of this Act, the Director shall submit to Con-*
 17 *gress and make publicly available a report describing the*
 18 *assessment performed under subsection (b)(1) and making*
 19 *recommendations about research priorities to address gaps*
 20 *in the measurement, technical standards, and conformity*
 21 *assessment needs identified by such assessment.*

22 **SEC. 409. TIP ADVISORY BOARD.**

23 *Section 28(k)(4) of the National Institute of Standards*
 24 *and Technology Act (15 U.S.C. 278n(k)(4)) is amended to*
 25 *read as follows:*

1 “(4) *FEDERAL ADVISORY COMMITTEE ACT APPLI-*
2 *CABILITY.*—

3 “(A) *IN GENERAL.*—*In discharging its du-*
4 *ties under this subsection, the TIP Advisory*
5 *Board shall function solely in an advisory ca-*
6 *capacity, in accordance with the Federal Advisory*
7 *Committee Act.*

8 “(B) *EXCEPTION.*—*Section 14 of the Fed-*
9 *eral Advisory Committee Act shall not apply to*
10 *the TIP Advisory Board.”.*

11 **SEC. 410. UNDERREPRESENTED MINORITIES.**

12 (a) *RESEARCH FELLOWSHIPS.*—*Section 18 of the Na-*
13 *tional Institute of Standards and Technology Act (15*
14 *U.S.C. 278g-1) is amended by adding at the end the fol-*
15 *lowing:*

16 “(c) *UNDERREPRESENTED MINORITIES.*—*In evalu-*
17 *ating applications for fellowships under this section, the Di-*
18 *rector shall give consideration to the goal of promoting the*
19 *participation of underrepresented minorities in research*
20 *areas supported by the Institute.”.*

21 (b) *POSTDOCTORAL FELLOWSHIP PROGRAM.*—*Section*
22 *19 of such Act (15 U.S.C. 278g-2) is amended by adding*
23 *at the end the following: “In evaluating applications for*
24 *fellowships under this section, the Director shall give consid-*
25 *eration to the goal of promoting the participation of under-*

1 *represented minorities in research areas supported by the*
 2 *Institute.”.*

3 (c) *TEACHER DEVELOPMENT.*—*Section 19A(c) of such*
 4 *Act (15 U.S.C. 278g-2a(c)) is amended by adding at the*
 5 *end the following: “The Director shall give special consider-*
 6 *ation to an application from a teacher from a high-need*
 7 *school, as defined in section 200 of the Higher Education*
 8 *Act of 1965 (20 U.S.C. 1021).”.*

9 **SEC. 411. CYBER SECURITY STANDARDS AND GUIDELINES.**

10 *Cyber security standards and guidelines developed by*
 11 *the National Institute of Standards and Technology for use*
 12 *by United States industry and the public shall be vol-*
 13 *untary.*

14 **SEC. 412. DEFINITIONS.**

15 *In this title:*

16 (1) *DIRECTOR.*—*The term “Director” means the*
 17 *Director of the National Institute of Standards and*
 18 *Technology.*

19 (2) *FEDERAL AGENCY.*—*The term “Federal agen-*
 20 *cy” has the meaning given such term in section 4 of*
 21 *the Stevenson-Wydler Technology Innovation Act of*
 22 *1980 (15 U.S.C. 3703).*

TITLE V—INNOVATION

SEC. 501. OFFICE OF INNOVATION AND ENTREPRENEURSHIP.

The Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3701 et seq.) is amended by adding at the end the following new section:

“SEC. 24. OFFICE OF INNOVATION AND ENTREPRENEURSHIP.

“(a) IN GENERAL.—The Secretary shall establish an Office of Innovation and Entrepreneurship to foster innovation and the commercialization of new technologies, products, processes, and services with the goal of promoting productivity and economic growth in the United States.

“(b) DUTIES.—The Office of Innovation and Entrepreneurship shall be responsible for—

“(1) developing and advocating policies to accelerate innovation and advance the commercialization of research and development, including federally funded research and development;

“(2) identifying existing barriers to innovation and commercialization, including access to capital and other resources, and ways to overcome those barriers;

1 “(3) providing access to relevant data, research,
2 and technical assistance on innovation and commer-
3 cialization;

4 “(4) strengthening collaboration on and coordi-
5 nation of policies relating to innovation and commer-
6 cialization within the Department of Commerce and
7 between the Department of Commerce and other Fed-
8 eral agencies, as appropriate; and

9 “(5) any other duties as determined by the Sec-
10 retary.

11 “(c) *ADVISORY COMMITTEE.*—The Secretary shall es-
12 tablish an Advisory Council on Innovation and Entrepre-
13 neurship to provide advice to the Secretary on carrying out
14 subsection (b).”.

15 **SEC. 502. FEDERAL LOAN GUARANTEES FOR INNOVATIVE**
16 **TECHNOLOGIES IN MANUFACTURING.**

17 *The Stevenson-Wydler Technology Innovation Act of*
18 *1980 (15 U.S.C. 3701 et seq.) is further amended by adding*
19 *after section 24, as added by section 501 of this title, the*
20 *following new section:*

21 **“SEC. 25. FEDERAL LOAN GUARANTEES FOR INNOVATIVE**
22 **TECHNOLOGIES IN MANUFACTURING.**

23 “(a) *ESTABLISHMENT.*—The Secretary shall establish
24 a program to provide loan guarantees for obligations to

1 *small- or medium-sized manufacturers for the use or pro-*
2 *duction of innovative technologies.*

3 “(b) *ELIGIBLE PROJECTS.*—*A loan guarantee may be*
4 *made under such program only for a project that reequips,*
5 *expands, or establishes a manufacturing facility in the*
6 *United States to—*

7 “(1) *use an innovative technology or an innova-*
8 *tive process in manufacturing; or*

9 “(2) *manufacture an innovative technology prod-*
10 *uct or an integral component of such product.*

11 “(c) *ELIGIBLE BORROWER.*—*A loan guarantee may be*
12 *made under such program only for a borrower who is a*
13 *small- or medium-sized manufacturer, as determined by the*
14 *Secretary under the criteria established pursuant to sub-*
15 *section (m).*

16 “(d) *LIMITATION ON AMOUNT.*—*A loan guarantee shall*
17 *not exceed an amount equal to 80 percent of the obligation,*
18 *as estimated at the time at which the loan guarantee is*
19 *issued.*

20 “(e) *LIMITATIONS ON LOAN GUARANTEE.*—*No loan*
21 *guarantee shall be made unless the Secretary determines*
22 *that—*

23 “(1) *there is a reasonable prospect of repayment*
24 *of the principal and interest on the obligation by the*
25 *borrower;*

1 “(2) the amount of the obligation (when com-
2 bined with amounts available to the borrower from
3 other sources) is sufficient to carry out the project;

4 “(3) the obligation is not subordinate to other fi-
5 nancing;

6 “(4) the obligation bears interest at a rate that
7 does not exceed a level that the Secretary determines
8 appropriate, taking into account the prevailing rate
9 of interest in the private sector for similar loans and
10 risks; and

11 “(5) the term of an obligation requires full re-
12 payment over a period not to exceed the lesser of—

13 “(A) 30 years; or

14 “(B) 90 percent of the projected useful life,
15 as determined by the Secretary, of the physical
16 asset to be financed by the obligation.

17 “(f) *DEFAULTS.*—

18 “(1) *PAYMENT BY SECRETARY.*—

19 “(A) *IN GENERAL.*—If a borrower defaults
20 (as defined in regulations promulgated by the
21 Secretary and specified in the loan guarantee)
22 on the obligation, the holder of the loan guar-
23 antee shall have the right to demand payment of
24 the unpaid amount from the Secretary.

1 “(B) *PAYMENT REQUIRED.*—Within such
2 period as may be specified in the loan guarantee
3 or related agreements, the Secretary shall pay to
4 the holder of the loan guarantee the unpaid in-
5 terest on and unpaid principal of the obligation
6 as to which the borrower has defaulted, unless the
7 Secretary finds that there was no default by the
8 borrower in the payment of interest or principal
9 or that the default has been remedied.

10 “(C) *FORBEARANCE.*—Nothing in this sub-
11 section precludes any forbearance by the holder
12 of the obligation for the benefit of the borrower
13 which may be agreed upon by the parties to the
14 obligation and approved by the Secretary.

15 “(2) *SUBROGATION.*—

16 “(A) *IN GENERAL.*—If the Secretary makes
17 a payment under paragraph (1), the Secretary
18 shall be subrogated to the rights, as specified in
19 the loan guarantee, of the recipient of the pay-
20 ment or related agreements including, if appro-
21 priate, the authority (notwithstanding any other
22 provision of law) to—

23 “(i) complete, maintain, operate, lease,
24 or otherwise dispose of any property ac-

1 *quired pursuant to such loan guarantee or*
 2 *related agreement; or*

3 “(ii) *permit the borrower, pursuant to*
 4 *an agreement with the Secretary, to con-*
 5 *tinue to pursue the purposes of the project*
 6 *if the Secretary determines that such an*
 7 *agreement is in the public interest.*

8 “(B) *SUPERIORITY OF RIGHTS.—The rights*
 9 *of the Secretary, with respect to any property ac-*
 10 *quired pursuant to a loan guarantee or related*
 11 *agreements, shall be superior to the rights of any*
 12 *other person with respect to the property.*

13 “(3) *ACTION BY ATTORNEY GENERAL.—*

14 “(A) *NOTIFICATION.—If the borrower de-*
 15 *faults on an obligation, the Secretary shall notify*
 16 *the Attorney General of the default.*

17 “(B) *RECOVERY.—On notification, the At-*
 18 *torney General shall take such action as is ap-*
 19 *propriate to recover the unpaid principal and*
 20 *interest.*

21 “(g) *PAYMENT OF PRINCIPAL AND INTEREST BY SEC-*
 22 *RETARY.—With respect to any obligation guaranteed under*
 23 *this section, the Secretary may enter into a contract to pay,*
 24 *and pay, holders of the obligation for and on behalf of the*
 25 *borrower from funds appropriated for that purpose the*

1 *principal and interest payments that become due and pay-*
2 *able on the unpaid balance of the obligation if the Secretary*
3 *finds that—*

4 “(1)(A) *the borrower is unable to make the pay-*
5 *ments and is not in default;*

6 “(B) *it is in the public interest to permit the*
7 *borrower to continue to pursue the project; and*

8 “(C) *the probable net benefit to the Federal Gov-*
9 *ernment in paying the principal and interest will be*
10 *greater than that which would result in the event of*
11 *a default;*

12 “(2) *the amount of the payment that the Sec-*
13 *retary is authorized to pay shall be no greater than*
14 *the amount of principal and interest that the bor-*
15 *rower is obligated to pay under the obligation being*
16 *guaranteed; and*

17 “(3) *the borrower agrees to reimburse the Sec-*
18 *retary for the payment (including interest) on terms*
19 *and conditions that are satisfactory to the Secretary.*

20 “(h) *TERMS AND CONDITIONS.—A loan guarantee*
21 *under this section shall include such detailed terms and con-*
22 *ditions as the Secretary determines appropriate to—*

23 “(1) *protect the interests of the United States in*
24 *the case of default; and*

1 “(2) *have available all the patents and tech-*
 2 *nology necessary for any person selected, including*
 3 *the Secretary, to complete and operate the project.*

4 “(i) *CONSULTATION.—In establishing the terms and*
 5 *conditions of a loan guarantee under this section, the Sec-*
 6 *retary shall consult with the Secretary of the Treasury.*

7 “(j) *FEES.—*

8 “(1) *IN GENERAL.—The Secretary shall charge*
 9 *and collect fees for loan guarantees in amounts the*
 10 *Secretary determines are sufficient to cover applicable*
 11 *administrative expenses.*

12 “(2) *AVAILABILITY.—Fees collected under this*
 13 *subsection shall—*

14 “(A) *be deposited by the Secretary into the*
 15 *Treasury of the United States; and*

16 “(B) *remain available until expended, sub-*
 17 *ject to such other conditions as are contained in*
 18 *annual appropriations Acts.*

19 “(k) *RECORDS.—*

20 “(1) *IN GENERAL.—With respect to a loan guar-*
 21 *antee under this section, the borrower, the lender, and*
 22 *any other appropriate party shall keep such records*
 23 *and other pertinent documents as the Secretary shall*
 24 *prescribe by regulation, including such records as the*
 25 *Secretary may require to facilitate an effective audit.*

1 “(2) *ACCESS.*—*The Secretary and the Com-*
 2 *troller General of the United States, or their duly au-*
 3 *thorized representatives, shall have access to records*
 4 *and other pertinent documents for the purpose of con-*
 5 *ducting an audit.*

6 “(l) *FULL FAITH AND CREDIT.*—*The full faith and*
 7 *credit of the United States is pledged to the payment of*
 8 *all loan guarantees issued under this section with respect*
 9 *to principal and interest.*

10 “(m) *REGULATIONS.*—*The Secretary shall issue final*
 11 *regulations before making any loan guarantees under the*
 12 *program. Such regulations shall include—*

13 “(1) *criteria that the Secretary shall use to de-*
 14 *termine eligibility for loan guarantees under this sec-*
 15 *tion, including—*

16 “(A) *whether a borrower is a small- or me-*
 17 *dium-sized manufacturer; and*

18 “(B) *whether a borrower demonstrates that*
 19 *a market exists for the innovative technology*
 20 *product, or the integral component of such prod-*
 21 *uct, to be manufactured, as evidenced by written*
 22 *statements of interest from potential purchasers;*

23 “(2) *policies and procedures for selecting and*
 24 *monitoring lenders and loan performance; and*

1 “(3) *any other policies, procedures, or informa-*
 2 *tion necessary to implement this section.*

3 “(n) *AUDIT.—*

4 “(1) *ANNUAL INDEPENDENT AUDITS.—The Sec-*
 5 *retary shall enter into an arrangement with an inde-*
 6 *pendent auditor for annual evaluations of the pro-*
 7 *gram under this section.*

8 “(2) *ANNUAL REVIEW.—The Comptroller General*
 9 *shall conduct an annual review of the Secretary’s exe-*
 10 *cution of the program under this section.*

11 “(3) *REPORT.—The results of the independent*
 12 *audit under paragraph (1) and the Comptroller Gen-*
 13 *eral’s review under paragraph (2) shall be provided*
 14 *directly to the Committee on Science and Technology*
 15 *of the House of Representatives and the Committee on*
 16 *Commerce, Science, and Transportation of the Senate.*

17 “(o) *REPORT TO CONGRESS.—Concurrent with the*
 18 *submission to Congress of the President’s annual budget re-*
 19 *quest in each year after the date of enactment of this section,*
 20 *the Secretary shall transmit to the Committee on Science*
 21 *and Technology of the House of Representatives and the*
 22 *Committee on Commerce, Science, and Transportation of*
 23 *the Senate a report containing a summary of all activities*
 24 *carried out under this section.*

1 “(p) *COORDINATION AND NONDUPLICATION.*—*To the*
2 *maximum extent practicable, the Secretary shall ensure*
3 *that the activities carried out under this section are coordi-*
4 *nated with, and do not duplicate the efforts of, other loan*
5 *guarantee programs within the Federal Government.*

6 “(q) *MEP CENTERS.*—*The Secretary may use centers*
7 *established under section 25 of the National Institute of*
8 *Standards and Technology Act (15 U.S.C. 278k) to provide*
9 *information about the program established under this sec-*
10 *tion and to conduct outreach to potential borrowers, as ap-*
11 *propriate.*

12 “(r) *MINIMIZING RISK.*—*The Secretary shall promul-*
13 *gate regulations and policies to carry out this section in*
14 *accordance with Office of Management and Budget Circular*
15 *No. A-129, entitled ‘Policies for Federal Credit Programs*
16 *and Non-Tax Receivables’, as in effect on the date of enact-*
17 *ment of this section.*

18 “(s) *SENSE OF CONGRESS.*—*It is the sense of Congress*
19 *that no loan guarantee shall be made under this section un-*
20 *less the borrower agrees to use a federally-approved elec-*
21 *tronic employment eligibility verification system to verify*
22 *the employment eligibility of—*

23 “(1) *all persons hired during the contract term*
24 *by the borrower to perform employment duties within*
25 *the United States; and*

1 “(2) *all persons assigned by the borrower to per-*
 2 *form work within the United States on the project.*

3 “(t) *DEFINITIONS.—In this section:*

4 “(1) *COST.—The term ‘cost’ has the meaning*
 5 *given such term under section 502 of the Federal*
 6 *Credit Reform Act of 1990 (2 U.S.C. 661a).*

7 “(2) *INNOVATIVE PROCESS.—The term ‘innova-*
 8 *tive process’ means a process that is significantly im-*
 9 *proved as compared to the process in general use in*
 10 *the commercial marketplace in the United States at*
 11 *the time the loan guarantee is issued.*

12 “(3) *INNOVATIVE TECHNOLOGY.—The term ‘inno-*
 13 *vative technology’ means a technology that is signifi-*
 14 *cantly improved as compared to the technology in*
 15 *general use in the commercial marketplace in the*
 16 *United States at the time the loan guarantee is*
 17 *issued.*

18 “(4) *LOAN GUARANTEE.—The term ‘loan guar-*
 19 *antee’ has the meaning given such term in section 502*
 20 *of the Federal Credit Reform Act of 1990 (2 U.S.C.*
 21 *661a). The term includes a loan guarantee commit-*
 22 *ment (as defined in section 502 of such Act (2 U.S.C.*
 23 *661a)).*

1 “(5) *OBLIGATION.*—*The term ‘obligation’ means*
 2 *the loan or other debt obligation that is guaranteed*
 3 *under this section.*

4 “(6) *PROGRAM.*—*The term ‘program’ means the*
 5 *loan guarantee program established in subsection (a).*

6 “(u) *AUTHORIZATION OF APPROPRIATIONS.*—

7 “(1) *COST OF LOAN GUARANTEES.*—*There are*
 8 *authorized to be appropriated \$50,000,000 for each of*
 9 *fiscal years 2011 through 2015 to provide the cost of*
 10 *loan guarantees under this section.*

11 “(2) *PRINCIPAL AND INTEREST.*—*There are au-*
 12 *thorized to be appropriated such sums as are nec-*
 13 *essary to carry out subsection (g).”.*

14 **SEC. 503. REGIONAL INNOVATION PROGRAM.**

15 *The Stevenson-Wydler Technology Innovation Act of*
 16 *1980 (15 U.S.C. 3701 et seq.) is further amended by adding*
 17 *after section 25, as added by section 502 of this title, the*
 18 *following new section:*

19 **“SEC. 26. REGIONAL INNOVATION PROGRAM.**

20 “(a) *ESTABLISHMENT.*—*The Secretary shall establish*
 21 *a regional innovation program to encourage and support*
 22 *the development of regional innovation strategies, including*
 23 *regional innovation clusters.*

24 “(b) *REGIONAL INNOVATION CLUSTER GRANTS.*—

1 “(1) *IN GENERAL.*—As part of the program es-
2 *tablished under subsection (a), the Secretary may*
3 *award grants on a competitive basis to eligible recipi-*
4 *ents for activities relating to the formation and devel-*
5 *opment of regional innovation clusters.*

6 “(2) *PERMISSIBLE ACTIVITIES.*—Grants awarded
7 *under this subsection may be used for activities deter-*
8 *mined appropriate by the Secretary, including the*
9 *following:*

10 “(A) *Feasibility studies.*

11 “(B) *Planning activities.*

12 “(C) *Technical assistance.*

13 “(D) *Developing or strengthening commu-*
14 *nication and collaboration between and among*
15 *participants of a regional innovation cluster.*

16 “(E) *Attracting additional participants to*
17 *a regional innovation cluster.*

18 “(F) *Facilitating market development of*
19 *products and services developed by a regional in-*
20 *novation cluster, including through demonstra-*
21 *tion, deployment, technology transfer, and com-*
22 *mercialization activities.*

23 “(G) *Developing relationships between a re-*
24 *gional innovation cluster and entities or clusters*
25 *in other regions.*

1 “(3) *ELIGIBLE RECIPIENT.*—For purposes of this
 2 subsection, the term ‘eligible recipient’ means any of
 3 the following:

4 “(A) *A State.*

5 “(B) *An Indian tribe.*

6 “(C) *A city or other political subdivision of*
 7 *a State.*

8 “(D) *An entity that—*

9 “(i) *is a nonprofit organization, an in-*
 10 *stitution of higher education, a public-pri-*
 11 *vate partnership, or an economic develop-*
 12 *ment organization or similar entity; and*

13 “(ii) *has an application that is sup-*
 14 *ported by a State or a political subdivision*
 15 *of a State.*

16 “(E) *A consortium of any of the entities*
 17 *listed in subparagraphs (A) through (D).*

18 “(4) *APPLICATION.*—

19 “(A) *IN GENERAL.*—*An eligible recipient*
 20 *shall submit an application to the Secretary at*
 21 *such time, in such manner, and containing such*
 22 *information and assurances as the Secretary*
 23 *may require.*

24 “(B) *COMPONENTS.*—*The application shall*
 25 *include, at a minimum, a description of the re-*

1 *gional innovation cluster supported by the pro-*
2 *posed activity, including a description of the fol-*
3 *lowing:*

4 “(i) *Whether the regional innovation*
5 *cluster is supported by the private sector,*
6 *State and local governments, and other rel-*
7 *evant stakeholders.*

8 “(ii) *How the existing participants in*
9 *the regional innovation cluster will encour-*
10 *age and solicit participation by all types of*
11 *entities that might benefit from participa-*
12 *tion, including newly formed entities and*
13 *those rival to existing participants.*

14 “(iii) *The extent to which the regional*
15 *innovation cluster is likely to stimulate in-*
16 *novation and have a positive impact on re-*
17 *gional economic growth and development.*

18 “(iv) *Whether the participants in the*
19 *regional innovation cluster have access to,*
20 *or contribute to, a well-trained workforce.*

21 “(v) *Whether the participants in the*
22 *regional innovation cluster are capable of*
23 *attracting additional funds from non-Fed-*
24 *eral sources.*

1 “(vi) *The likelihood that the partici-*
2 *pants in the regional innovation cluster will*
3 *be able to sustain activities once grant*
4 *funds under this subsection have been ex-*
5 *pended.*

6 “(5) *COST SHARE.—The Secretary may not pro-*
7 *vide more than 50 percent of the total cost of any ac-*
8 *tivity funded under this subsection.*

9 “(6) *USE AND APPLICATION OF RESEARCH AND*
10 *INFORMATION PROGRAM.—To the maximum extent*
11 *practicable, the Secretary shall ensure that activities*
12 *funded under this subsection use and apply any rel-*
13 *evant research, best practices, and metrics developed*
14 *under the program established in subsection (c).*

15 “(c) *REGIONAL INNOVATION RESEARCH AND INFORMA-*
16 *TION PROGRAM.—*

17 “(1) *IN GENERAL.—As part of the program es-*
18 *tablished under subsection (a), the Secretary shall es-*
19 *tablish a regional innovation research and informa-*
20 *tion program to—*

21 “(A) *gather, analyze, and disseminate infor-*
22 *mation on best practices for regional innovation*
23 *strategies (including regional innovation clus-*
24 *ters), including information relating to how in-*

novation, productivity, and economic development can be maximized through such strategies;

“(B) provide technical assistance, including through the development of technical assistance guides, for the development and implementation of regional innovation strategies (including regional innovation clusters);

“(C) support the development of relevant metrics and measurement standards to evaluate regional innovation strategies (including regional innovation clusters), including the extent to which such strategies stimulate innovation, productivity, and economic development; and

“(D) collect and make available data on regional innovation cluster activity in the United States, including data on—

“(i) the size, specialization, and competitiveness of regional innovation clusters;

“(ii) the regional domestic product contribution, total jobs and earnings by key occupations, establishment size, nature of specialization, patents, Federal research and development spending, and other relevant information for regional innovation clusters; and

1 “(iii) supply chain product and service
2 flows within and between regional innova-
3 tion clusters.

4 “(2) *RESEARCH GRANTS*.—The Secretary may
5 award research grants on a competitive basis to sup-
6 port and further the goals of the program established
7 under this subsection.

8 “(3) *DISSEMINATION OF INFORMATION*.—Data
9 and analysis compiled by the Secretary under the
10 program established in this subsection shall be made
11 available to other Federal agencies, State and local
12 governments, and nonprofit and for-profit entities.

13 “(4) *CLUSTER GRANT PROGRAM*.—The Secretary
14 shall incorporate data and analysis relating to any
15 regional innovation cluster supported by a grant
16 under subsection (b) into the program established
17 under this subsection.

18 “(d) *INTERAGENCY COORDINATION*.—

19 “(1) *IN GENERAL*.—To the maximum extent
20 practicable, the Secretary shall ensure that the activi-
21 ties carried out under this section are coordinated
22 with, and do not duplicate the efforts of, other pro-
23 grams at the Department of Commerce or other Fed-
24 eral agencies.

1 “(2) *COLLABORATION.*—*The Secretary shall ex-*
 2 *plore and pursue collaboration with other Federal*
 3 *agencies, including through multiagency funding op-*
 4 *portunities, on regional innovation strategies.*

5 “(e) *EVALUATION.*—

6 “(1) *IN GENERAL.*—*Not later than 4 years after*
 7 *the date of enactment of this section, the Secretary*
 8 *shall enter into a contract with an independent enti-*
 9 *ty, such as the National Academy of Sciences, to con-*
 10 *duct an evaluation of the program established under*
 11 *subsection (a).*

12 “(2) *REQUIREMENTS.*—*The evaluation shall in-*
 13 *clude—*

14 “(A) *whether such program is achieving its*
 15 *goals;*

16 “(B) *any recommendations for how such*
 17 *program may be improved; and*

18 “(C) *a recommendation as to whether such*
 19 *program should be continued or terminated.*

20 “(f) *REGIONAL INNOVATION CLUSTER DEFINED.*—*The*
 21 *term ‘regional innovation cluster’ means a geographically*
 22 *bounded network of similar, synergistic, or complementary*
 23 *entities that—*

24 “(1) *are engaged in or with a particular indus-*
 25 *try sector;*

1 “(2) *have active channels for business trans-*
2 *actions and communication;*

3 “(3) *share specialized infrastructure, labor mar-*
4 *kets, and services; and*

5 “(4) *leverage the region’s unique competitive*
6 *strengths to stimulate innovation and create jobs.*

7 “(g) *AUTHORIZATION OF APPROPRIATIONS.—There*
8 *are authorized to be appropriated such sums as are nec-*
9 *essary for each of fiscal years 2011 through 2015 to carry*
10 *out this section, including such sums as are necessary to*
11 *carry out the evaluation required under subsection (e).”.*

12 ***TITLE VI—DEPARTMENT OF***
13 ***ENERGY***

14 ***Subtitle A—Office of Science***

15 ***SEC. 601. SHORT TITLE.***

16 *This subtitle may be cited as the “Department of En-*
17 *ergy Office of Science Authorization Act of 2010”.*

18 ***SEC. 602. DEFINITIONS.***

19 *Except as otherwise provided, in this subtitle:*

20 (1) *DEPARTMENT.—The term “Department”*
21 *means the Department of Energy.*

22 (2) *DIRECTOR.—The term “Director” means the*
23 *Director of the Office of Science.*

1 (3) *OFFICE OF SCIENCE.*—The term “Office of
2 *Science*” means the Department of Energy Office of
3 *Science*.

4 (4) *SECRETARY.*—The term “Secretary” means
5 *the Secretary of Energy*.

6 **SEC. 603. MISSION OF THE OFFICE OF SCIENCE.**

7 (a) *MISSION.*—The mission of the Office of Science
8 *shall be the delivery of scientific discoveries, capabilities,*
9 *and major scientific tools to transform the understanding*
10 *of nature and to advance the energy, economic, and na-*
11 *tional security of the United States.*

12 (b) *DUTIES.*—In support of this mission, the Secretary
13 *shall carry out, through the Office of Science, programs on*
14 *basic energy sciences, biological and environmental re-*
15 *search, advanced scientific computing research, fusion en-*
16 *ergy sciences, high energy physics, and nuclear physics*
17 *through activities focused on—*

18 (1) *Science for Discovery to unravel nature’s*
19 *mysteries through the study of subatomic particles,*
20 *atoms, and molecules that make up the materials of*
21 *our everyday world to DNA, proteins, cells, and en-*
22 *tire biological systems;*

23 (2) *Science for National Need by—*

1 (A) *advancing a clean energy agenda*
2 *through research on energy production, storage,*
3 *transmission, efficiency, and use; and*

4 (B) *advancing our understanding of the*
5 *Earth's climate through research in atmospheric*
6 *and environmental sciences and climate change;*
7 *and*

8 (3) *National Scientific User Facilities to deliver*
9 *the 21st century tools of science, engineering, and*
10 *technology and provide the Nation's researchers with*
11 *the most advanced tools of modern science including*
12 *accelerators, colliders, supercomputers, light sources*
13 *and neutron sources, and facilities for studying the*
14 *nanoworld.*

15 (c) *SUPPORTING ACTIVITIES.—The activities described*
16 *in subsection (b) shall include providing for relevant facili-*
17 *ties and infrastructure, analysis, coordination, and edu-*
18 *cation and outreach activities.*

19 (d) *USER FACILITIES.—The Director shall carry out*
20 *the construction, operation, and maintenance of user facili-*
21 *ties to support the activities described in subsection (b). As*
22 *practicable, these facilities shall serve the needs of the De-*
23 *partment, industry, the academic community, and other*
24 *relevant entities for the purposes of advancing the missions*
25 *of the Department.*

1 (e) *OTHER AUTHORIZED ACTIVITIES.*—*In addition to*
2 *the activities authorized under this subtitle, the Office of*
3 *Science shall carry out such other activities it is authorized*
4 *or required to carry out by law.*

5 (f) *COORDINATION AND JOINT ACTIVITIES.*—*The De-*
6 *partment’s Under Secretary for Science shall ensure the co-*
7 *ordination of activities under this subtitle with the other*
8 *activities of the Department, and shall support joint activi-*
9 *ties among the programs of the Department.*

10 (g) *DOMESTICALLY SOURCED HARDWARE.*—

11 (1) *PLAN.*—*The Director shall develop a plan to*
12 *increase the percentage of domestically sourced hard-*
13 *ware for planned and ongoing projects of the Depart-*
14 *ment of Energy. In developing this plan, the Director*
15 *shall—*

16 (A) *give consideration to technologies that*
17 *the United States does not currently have the ca-*
18 *capacity to manufacture and to procurement ac-*
19 *tivities that can strengthen United States high-*
20 *technology competitiveness broadly;*

21 (B) *seek opportunities to engage and part-*
22 *ner with domestic manufacturers; and*

23 (C) *annually assess levels of domestically*
24 *available goods relevant to planned and ongoing*
25 *projects of the Office of Science.*

1 (2) *INTERNATIONAL AGREEMENTS.*—*This sub-*
2 *section shall be applied in a manner consistent with*
3 *United States obligations under international agree-*
4 *ments.*

5 (3) *REPORT TO CONGRESS.*—*Not later than 1*
6 *year after the date of enactment of this Act, the Direc-*
7 *tor shall transmit the plan developed under this sub-*
8 *section to the Committee on Energy and Natural Re-*
9 *sources of the Senate and the Committee on Science*
10 *and Technology of the House of Representatives, and*
11 *shall transmit any appropriate updates to those com-*
12 *mittees.*

13 (h) *MERIT-REVIEWED STUDY.*—*As part of the Presi-*
14 *dent's annual budget request, the Secretary shall include a*
15 *detailed summary of the degree to which current research*
16 *activities are competitive and merit-reviewed, including a*
17 *list of activities that would have been undertaken in the*
18 *absence of Congressionally-directed projects and an analysis*
19 *of the effects of increasing the proportion of competitive,*
20 *merit-reviewed activities on the strategic objectives of the*
21 *Office of Science.*

22 **SEC. 604. BASIC ENERGY SCIENCES PROGRAM.**

23 (a) *PROGRAM.*—*As part of the activities authorized*
24 *under section 603, the Director shall carry out a program*
25 *in basic energy sciences, including materials sciences and*

1 *engineering, chemical sciences, physical biosciences, and*
2 *geosciences, for the purpose of providing the scientific foun-*
3 *dations for new energy technologies.*

4 *(b) BASIC ENERGY SCIENCES USER FACILITIES.—*

5 *(1) IN GENERAL.—The Director shall carry out*
6 *a program for the construction, operation, and main-*
7 *tenance of national user facilities to support the pro-*
8 *gram under this section. As practicable, these facili-*
9 *ties shall serve the needs of the Department, industry,*
10 *the academic community, and other relevant entities*
11 *to create and examine new materials and chemical*
12 *processes for the purposes of advancing new energy*
13 *technologies and improving the competitiveness of the*
14 *United States. These facilities shall include—*

15 *(A) x-ray light sources;*

16 *(B) neutron sources;*

17 *(C) electron beam microcharacterization*
18 *centers;*

19 *(D) nanoscale science research centers; and*

20 *(E) other facilities the Director considers*
21 *appropriate, consistent with section 603(d).*

22 *(2) FACILITY CONSTRUCTION AND UPGRADES.—*

23 *Consistent with the Office of Science's project man-*
24 *agement practices, the Director shall support con-*
25 *struction of—*

1 (A) *the National Synchrotron Light Source*

2 II;

3 (B) *a Second Target Station at the Spall-*
4 *ation Neutron Source; and*

5 (C) *an upgrade of the Advanced Photon*
6 *Source to improve brightness and performance.*

7 (c) *ENERGY FRONTIER RESEARCH CENTERS.—*

8 (1) *IN GENERAL.—The Director shall carry out*
9 *a grant program to provide awards, on a competitive,*
10 *merit-reviewed basis, to multi-institutional collabora-*
11 *tions or other appropriate entities to conduct funda-*
12 *mental and use-inspired energy research to accelerate*
13 *scientific breakthroughs related to needs identified*
14 *in—*

15 (A) *the Grand Challenges report of the De-*
16 *partment’s Basic Energy Sciences Advisory*
17 *Committee;*

18 (B) *the Basic Energy Sciences Basic Re-*
19 *search Needs workshop reports;*

20 (C) *energy-related Grand Challenges for*
21 *Engineering, as described by the National Acad-*
22 *emy of Engineering; or*

23 (D) *other relevant reports identified by the*
24 *Director.*

1 (2) *COLLABORATIONS.*—*A collaboration receiving*
 2 *a grant under this subsection may include multiple*
 3 *types of institutions and private sector entities.*

4 (3) *SELECTION AND DURATION.*—

5 (A) *IN GENERAL.*—*A collaboration under*
 6 *this subsection shall be selected for a period of 5*
 7 *years.*

8 (B) *REAPPLICATION.*—*After the end of the*
 9 *period described in subparagraph (A), a grantee*
 10 *may reapply for selection for a second period of*
 11 *5 years on a competitive, merit-reviewed basis.*

12 (4) *NO FUNDING FOR CONSTRUCTION.*—*No fund-*
 13 *ing provided pursuant to this subsection may be used*
 14 *for the construction of new buildings or facilities.*

15 (d) *ACCELERATOR RESEARCH AND DEVELOPMENT.*—
 16 *The Director shall carry out research and development on*
 17 *advanced accelerator technologies relevant to the develop-*
 18 *ment of Basic Energy Sciences user facilities, in consulta-*
 19 *tion with the Office of Science’s High Energy Physics and*
 20 *Nuclear Physics programs.*

21 **SEC. 605. BIOLOGICAL AND ENVIRONMENTAL RESEARCH**
 22 **PROGRAM.**

23 (a) *IN GENERAL.*—*As part of the activities authorized*
 24 *under section 603, and coordinated with the activities au-*
 25 *thorized in section 604, the Director shall carry out a pro-*

1 *gram of research, development, and demonstration in the*
2 *areas of biological systems science and climate and environ-*
3 *mental science to support the energy and environmental*
4 *missions of the Department.*

5 *(b) BIOLOGICAL SYSTEMS SCIENCE ACTIVITIES.—*

6 *(1) ACTIVITIES.—As part of the activities au-*
7 *thorized under subsection (a), the Director shall carry*
8 *out research, development, and demonstration activi-*
9 *ties in fundamental, structural, computational, and*
10 *systems biology to increase systems-level under-*
11 *standing of complex biological systems, which shall*
12 *include activities to—*

13 *(A) accelerate breakthroughs and new*
14 *knowledge that will enable cost-effective sustain-*
15 *able production of—*

16 *(i) biomass-based liquid transportation*
17 *fuels, including hydrogen;*

18 *(ii) bioenergy; and*

19 *(iii) biobased products,*

20 *that support the energy and environmental mis-*
21 *sions of the Department;*

22 *(B) improve understanding of the global*
23 *carbon cycle, including processes for removing*
24 *carbon dioxide from the atmosphere, through*

1 *photosynthesis and other biological processes, for*
2 *sequestration and storage; and*

3 *(C) understand the biological mechanisms*
4 *used to destroy, immobilize, or remove contami-*
5 *nants from subsurface environments.*

6 *(2) RESEARCH PLAN.—*

7 *(A) REQUIREMENT.—Not later than 1 year*
8 *after the date of enactment of this Act, the Direc-*
9 *tor shall prepare and transmit to Congress a re-*
10 *search plan describing how the activities author-*
11 *ized under this subsection will be undertaken.*

12 *(B) UTILIZATION OF EXISTING PLAN.—In*
13 *developing the plan in subparagraph (A), the*
14 *Director may utilize an existing research plan*
15 *and update such plan to incorporate the activi-*
16 *ties identified in paragraph (1).*

17 *(C) UPDATES.—Not later than 3 years after*
18 *the initial report under this paragraph, and at*
19 *least once every 3 years thereafter, the Director*
20 *shall update the research plan and transmit it to*
21 *Congress.*

22 *(3) BIOENERGY RESEARCH CENTERS.—*

23 *(A) IN GENERAL.—In carrying out the ac-*
24 *tivities under paragraph (1), the Director shall*
25 *support at least 3 bioenergy research centers to*

1 *accelerate basic biological research, development,*
2 *demonstration, and commercial application of*
3 *biomass-based liquid transportation fuels, bio-*
4 *energy, and biobased products that support the*
5 *energy and environmental missions of the De-*
6 *partment and are produced from a variety of re-*
7 *gionally diverse feedstocks.*

8 *(B) GEOGRAPHIC DISTRIBUTION.—The Di-*
9 *rector shall ensure that the bioenergy research*
10 *centers under this paragraph are established in*
11 *geographically diverse locations.*

12 *(C) SELECTION AND DURATION.—A center*
13 *established under subparagraph (A) shall be se-*
14 *lected on a competitive, merit-reviewed basis for*
15 *a period of 5 years beginning on the date of es-*
16 *tablishment of that center. A center already in*
17 *existence on the date of enactment of this Act*
18 *may continue to receive support for a period of*
19 *5 years beginning on the date of establishment of*
20 *that center.*

21 *(4) ENABLING SYNTHETIC BIOLOGY PLAN.—*

22 *(A) IN GENERAL.—The Secretary, in con-*
23 *sultation with other relevant Federal agencies,*
24 *the academic community, research-based non-*
25 *profit entities, and the private sector, shall de-*

1 *velop a comprehensive plan for federally sup-*
2 *ported research and development activities that*
3 *will support the energy and environmental mis-*
4 *sions of the Department and enable a competi-*
5 *tive synthetic biology industry in the United*
6 *States.*

7 (B) *PLAN.—The plan developed under sub-*
8 *paragraph (A) shall assess the need to create a*
9 *database for synthetic biology information, the*
10 *need and process for developing standards for bi-*
11 *ological parts, components and systems, and the*
12 *need for a federally funded facility that enables*
13 *the discovery, design, development, production,*
14 *and systematic use of parts, components, and*
15 *systems created through synthetic biology. The*
16 *plan shall describe the role of the Federal Gov-*
17 *ernment in meeting these needs.*

18 (C) *SUBMISSION TO CONGRESS.—The Sec-*
19 *retary shall transmit the plan developed under*
20 *subparagraph (A) to the Congress not later than*
21 *9 months after the date of enactment of this Act.*

22 (5) *COMPUTATIONAL BIOLOGY AND SYSTEMS BI-*
23 *LOGY KNOWLEDGEBASE.—As part of the activities*
24 *described in paragraph (1), the Director, in collabora-*
25 *tion with the Advanced Scientific Computing Re-*

1 *search program described in section 606, shall carry*
2 *out research in computational biology, acquire or oth-*
3 *erwise ensure the availability of hardware for biology-*
4 *specific computation, and establish and maintain an*
5 *open virtual database and information management*
6 *system to centrally integrate systems biology data,*
7 *analytical software, and computational modeling*
8 *tools that will allow data sharing and free informa-*
9 *tion exchange within the scientific community.*

10 (6) *PROHIBITION ON BIOMEDICAL AND HUMAN*
11 *CELL AND HUMAN SUBJECT RESEARCH.—*

12 (A) *NO BIOMEDICAL RESEARCH.—In car-*
13 *rying out activities under subsection (b), the Sec-*
14 *retary shall not conduct biomedical research.*

15 (B) *LIMITATIONS.—Nothing in subsection*
16 *(b) shall authorize the Secretary to conduct any*
17 *research or demonstrations—*

18 (i) *on human cells or human subjects;*

19 *or*

20 (ii) *designed to have direct application*
21 *with respect to human cells or human sub-*
22 *jects.*

23 (C) *INFORMATION SHARING.—Nothing in*
24 *this paragraph shall restrict the Department*
25 *from sharing information, including research*

1 *findings, research methodologies, models, or any*
2 *other information, with any Federal agency.*

3 (7) *REPEAL.—Section 977 of the Energy Policy*
4 *Act of 2005 (42 U.S.C. 16317) is repealed.*

5 (c) *CLIMATE AND ENVIRONMENTAL SCIENCES ACTIVI-*
6 *TIES.—*

7 (1) *IN GENERAL.—As part of the activities au-*
8 *thorized under subsection (a), the Director shall carry*
9 *out climate and environmental science research,*
10 *which shall include activities to—*

11 (A) *understand, observe, and model the re-*
12 *sponse of the Earth’s atmosphere and biosphere,*
13 *including oceans, to increased concentrations of*
14 *greenhouse gas emissions, and any associated*
15 *changes in climate;*

16 (B) *understand the processes for sequestra-*
17 *tion, destruction, immobilization, or removal of,*
18 *and understand the movement of, contaminants*
19 *and carbon in subsurface environments, includ-*
20 *ing at facilities of the Department; and*

21 (C) *inform potential mitigation and adap-*
22 *tation options for increased concentrations of*
23 *greenhouse gas emissions and any associated*
24 *changes in climate.*

(2) *SUBSURFACE BIOGEOCHEMISTRY RE-
SEARCH.*—

(A) *IN GENERAL.*—*As part of the activities described in paragraph (1), the Director shall carry out research to advance a fundamental understanding of coupled physical, chemical, and biological processes for controlling the movement of sequestered carbon and subsurface environmental contaminants, including field observations of subsurface microorganisms and field-scale subsurface research.*

(B) *COORDINATION.*—

(i) *DIRECTOR.*—*The Director shall carry out activities under this paragraph in accordance with priorities established by the Department's Under Secretary for Science to support and accelerate the decontamination of relevant facilities managed by the Department.*

(ii) *UNDER SECRETARY FOR SCIENCE.*—*The Department's Under Secretary for Science shall ensure the coordination of the activities of the Department, including activities under this paragraph, to support and accelerate the decontamination*

1 *of relevant facilities managed by the De-*
2 *partment.*

3 (3) *NEXT-GENERATION ECOSYSTEM-CLIMATE EX-*
4 *PERIMENT.—*

5 (A) *IN GENERAL.—As part of the activities*
6 *described in paragraph (1), the Director, in col-*
7 *laboration with other relevant agencies that are*
8 *participants in the United States Global Change*
9 *Research Program, shall carry out the selection*
10 *and development of a next-generation ecosystem-*
11 *climate change experiment to understand the im-*
12 *pact and feedbacks of increased temperature and*
13 *elevated carbon levels on ecosystems.*

14 (B) *REPORT.—Not later than 1 year after*
15 *the date of enactment of this Act, the Director*
16 *shall transmit to the Congress a report con-*
17 *taining—*

18 (i) *an identification of the location or*
19 *locations that have been selected for the ex-*
20 *periment described in subparagraph (A);*

21 (ii) *a description of the need for addi-*
22 *tional experiments; and*

23 (iii) *an associated research plan.*

24 (4) *AMERIFLUX NETWORK COORDINATION AND*
25 *RESEARCH.—As part of the activities described in*

1 paragraph (1), the Director shall carry out research
2 and coordinate the AmeriFlux Network to directly ob-
3 serve and understand the exchange of greenhouse
4 gases, water vapor, and heat energy within terrestrial
5 ecosystems and the response of those systems to cli-
6 mate change and other dynamic terrestrial landscape
7 changes. The Director, in collaboration with other rel-
8 evant Federal agencies, shall—

9 (A) identify opportunities to incorporate in-
10 novative and emerging observation technologies
11 and practices into the existing Network;

12 (B) conduct research to determine the need
13 for increased greenhouse gas observation Network
14 facilities across North America to meet future
15 mitigation and adaptation needs of the United
16 States; and

17 (C) examine how the technologies and prac-
18 tices described in subparagraph (A), and in-
19 creased coordination among scientific commu-
20 nities through the Network, have the potential to
21 help characterize terrestrial baseline greenhouse
22 gas emission sources and sinks in the United
23 States and internationally.

24 (5) CLIMATE AND EARTH MODELING.—As part of
25 the activities described in paragraph (1), the Director,

1 *in collaboration with the Advanced Scientific Com-*
2 *puting Research program described in section 606,*
3 *shall carry out research to develop, evaluate, and use*
4 *high-resolution regional climate, global climate,*
5 *Earth, and predictive models to inform decisions on*
6 *reducing the impacts of changing climate.*

7 (6) *INTEGRATED ASSESSMENT RESEARCH.*—As
8 *part of the activities described in paragraph (1), the*
9 *Director shall carry out research into options for*
10 *mitigation of and adaptation to climate change*
11 *through multiscale models of the entire climate sys-*
12 *tem. Such modeling shall include human processes*
13 *and greenhouse gas emissions, land use, and inter-*
14 *action among human and Earth systems.*

15 (7) *COORDINATION.*—The Director shall coordi-
16 *nate activities under this subsection with other Office*
17 *of Science activities and with the United States Glob-*
18 *al Change Research Program.*

19 (d) *USER FACILITIES AND ANCILLARY EQUIPMENT.*—

20 (1) *IN GENERAL.*—The Director shall carry out
21 *a program for the construction, operation, and main-*
22 *tenance of user facilities to support the program*
23 *under this section. As practicable, these facilities shall*
24 *serve the needs of the Department, industry, the aca-*
25 *demic community, and other relevant entities.*

1 (2) *INCLUDED FUNCTIONS.*—*User facilities de-*
2 *scribed in paragraph (1) shall include facilities which*
3 *carry out—*

4 (A) *genome sequencing and analysis of*
5 *plants, microbes, and microbial communities*
6 *using high throughput tools, technologies, and*
7 *comparative analysis;*

8 (B) *molecular level research in biological,*
9 *chemical, environmental, and subsurface sciences,*
10 *including synthesis, dynamic properties, and*
11 *interactions among natural and engineered ma-*
12 *terials; and*

13 (C) *measurement of cloud and aerosol prop-*
14 *erties used for examining atmospheric processes*
15 *and evaluating climate model performance, in-*
16 *cluding ground stations at various locations, mo-*
17 *bile resources, and aerial vehicles.*

18 **SEC. 606. ADVANCED SCIENTIFIC COMPUTING RESEARCH**
19 **PROGRAM.**

20 (a) *IN GENERAL.*—*As part of the activities authorized*
21 *under section 603, the Director shall carry out a research,*
22 *development, demonstration, and commercial application*
23 *program to advance computational and networking capa-*
24 *bilities to analyze, model, simulate, and predict complex*

1 *phenomena relevant to the development of new energy tech-*
2 *nologies and the competitiveness of the United States.*

3 *(b) COORDINATION.—*

4 *(1) DIRECTOR.—The Director shall carry out ac-*
5 *tivities under this section in accordance with prior-*
6 *ities established by the Department’s Under Secretary*
7 *for Science to determine and meet the computational*
8 *and networking research and facility needs of the Of-*
9 *fice of Science and all other relevant energy tech-*
10 *nology and energy efficiency programs within the De-*
11 *partment.*

12 *(2) UNDER SECRETARY FOR SCIENCE.—The De-*
13 *partment’s Under Secretary for Science shall ensure*
14 *the coordination of the activities of the Department,*
15 *including activities under this section, to determine*
16 *and meet the computational and networking research*
17 *and facility needs of the Office of Science and all*
18 *other relevant energy technology and energy efficiency*
19 *programs within the Department.*

20 *(c) RESEARCH TO SUPPORT ENERGY APPLICATIONS.—*

21 *As part of the activities authorized under subsection (a),*
22 *the program shall support research in high-performance*
23 *computing and networking relevant to energy applications,*
24 *including both basic and applied energy research programs*
25 *carried out by the Secretary.*

1 (d) *REPORTS.*—

2 (1) *ADVANCED COMPUTING FOR ENERGY APPLI-*
3 *CATIONS.*—*Not later than one year after the date of*
4 *enactment of this Act, the Secretary shall transmit to*
5 *the Congress a plan to integrate and leverage the ex-*
6 *pertise and capabilities of the program described in*
7 *subsection (a), as well as other relevant computa-*
8 *tional and networking research programs and re-*
9 *sources supported by the Federal Government, to ad-*
10 *vance the missions of the Department's applied en-*
11 *ergy and energy efficiency programs.*

12 (2) *EXASCALE COMPUTING.*—*At least 18 months*
13 *prior to the initiation of construction or installation*
14 *of any exascale-class computing facility, the Secretary*
15 *shall transmit a plan to the Congress detailing—*

16 (A) *the proposed facility's cost projections*
17 *and capabilities to significantly accelerate the*
18 *development of new energy technologies;*

19 (B) *technical risks and challenges that must*
20 *be overcome to achieve successful completion and*
21 *operation of the facility; and*

22 (C) *an assessment of the scientific and tech-*
23 *nological advances expected from such a facility*
24 *relative to those expected from a comparable in-*
25 *vestment in expanded research and applications*

1 *at terascale-class and petascale-class computing*
2 *facilities.*

3 *(e) APPLIED MATHEMATICS AND SOFTWARE DEVELOP-*
4 *MENT FOR HIGH-END COMPUTING SYSTEMS.—The Director*
5 *shall carry out activities to develop, test, and support math-*
6 *ematics, models, and algorithms for complex systems, as*
7 *well as programming environments, tools, languages, and*
8 *operating systems for high-end computing systems (as de-*
9 *finied in section 2 of the Department of Energy High-End*
10 *Computing Revitalization Act of 2004 (15 U.S.C. 5541)).*

11 *(f) HIGH-END COMPUTING FACILITIES.—The Director*
12 *shall—*

13 *(1) provide for sustained access by the public*
14 *and private research community in the United States*
15 *to high-end computing systems, including access to*
16 *the National Energy Research Scientific Computing*
17 *Center and to Leadership Systems (as defined in sec-*
18 *tion 2 of the Department of Energy High-End Com-*
19 *puting Revitalization Act of 2004 (15 U.S.C. 5541));*

20 *(2) provide technical support for users of such*
21 *systems; and*

22 *(3) conduct research and development on next-*
23 *generation computing architectures and platforms to*
24 *support the missions of the Department.*

1 (g) *OUTREACH.*—*The Secretary shall conduct outreach*
2 *programs and may form partnerships to increase the use*
3 *of and access to high-performance computing modeling and*
4 *simulation capabilities by industry, including manufactur-*
5 *ers.*

6 **SEC. 607. FUSION ENERGY RESEARCH PROGRAM.**

7 (a) *PROGRAM.*—*As part of the activities authorized*
8 *under section 603, the Director shall carry out a fusion en-*
9 *ergy sciences research and enabling technology development*
10 *program to effectively address the scientific and engineering*
11 *challenges to building a cost-competitive fusion power plant*
12 *and a competitive fusion power industry in the United*
13 *States. As part of this program, the Director shall carry*
14 *out research activities to expand the fundamental under-*
15 *standing of plasmas and matter at very high temperatures*
16 *and densities.*

17 (b) *ITER.*—*The Director shall coordinate and carry*
18 *out the responsibilities of the United States with respect to*
19 *the ITER international fusion project pursuant to the*
20 *Agreement on the Establishment of the ITER International*
21 *Fusion Energy Organization for the Joint Implementation*
22 *of the ITER Project.*

23 (c) *IDENTIFICATION OF PRIORITIES.*—*Not later than*
24 *18 months after the date of enactment of this Act, the Sec-*
25 *retary shall transmit to the Congress a report on the De-*

1 *partment's proposed research and development activities in*
2 *magnetic fusion over the 10 years following the date of en-*
3 *actment of this Act under four realistic budget scenarios.*

4 *The report shall—*

5 *(1) identify specific areas of fusion energy re-*
6 *search and enabling technology development in which*
7 *the United States can and should establish or solidify*
8 *a lead in the global fusion energy development effort;*
9 *and*

10 *(2) identify priorities for initiation of facility*
11 *construction and facility decommissioning under each*
12 *of those scenarios.*

13 *(d) FUSION MATERIALS RESEARCH AND DEVELOP-*
14 *MENT.—The Director, in coordination with the Assistant*
15 *Secretary for Nuclear Energy of the Department, shall*
16 *carry out research and development activities to identify,*
17 *characterize, and create materials that can endure the neu-*
18 *tron, plasma, and heat fluxes expected in a commercial fu-*
19 *sion power plant. As part of the activities authorized under*
20 *subsection (c), the Secretary shall—*

21 *(1) provide an assessment of the need for a facil-*
22 *ity or facilities that can examine and test potential*
23 *fusion and next generation fission materials and*
24 *other enabling technologies relevant to the develop-*
25 *ment of commercial fusion power plants; and*

1 (2) *provide an assessment of whether a single*
2 *new facility that substantially addresses magnetic fu-*
3 *sion, inertial fusion, and next generation fission ma-*
4 *terials research needs is feasible, in conjunction with*
5 *the expected capabilities of facilities operational as of*
6 *the date of enactment of this Act.*

7 (e) *ENABLING TECHNOLOGY DEVELOPMENT.—The Di-*
8 *rector shall carry out activities to develop technologies nec-*
9 *essary to enable the reliable, sustainable, safe, and economi-*
10 *cally competitive operation of a commercial fusion power*
11 *plant.*

12 (f) *FUSION SIMULATION PROJECT.—In collaboration*
13 *with the Office of Science’s Advanced Scientific Computing*
14 *Research program described in section 606, the Director*
15 *shall carry out a computational project to advance the ca-*
16 *pability of fusion researchers to accurately simulate an en-*
17 *tire fusion energy system.*

18 (g) *INERTIAL FUSION ENERGY RESEARCH AND DE-*
19 *VELOPMENT PROGRAM.—The Secretary shall carry out a*
20 *program of research and technology development in inertial*
21 *fusion for energy applications, including ion beam and*
22 *laser fusion. Not later than 180 days after the release of*
23 *a report from the National Academies on inertial fusion*
24 *energy research, the Secretary shall transmit to Congress*
25 *a report describing the Department’s plan to incorporate*

1 *any relevant recommendations from the National Acad-*
2 *emies' report into this program.*

3 **SEC. 608. HIGH ENERGY PHYSICS PROGRAM.**

4 (a) *PROGRAM.*—As part of the activities authorized
5 under section 603, the Director shall carry out a research
6 program on the elementary constituents of matter and en-
7 ergy and the nature of space and time.

8 (b) *NEUTRINO RESEARCH.*—As part of the program
9 described in subsection (a), the Director shall carry out re-
10 search activities on rare decay processes and the nature of
11 the neutrino, which may—

12 (1) *include collaborations with the National*
13 *Science Foundation on relevant projects; and*

14 (2) *utilize components of existing accelerator fa-*
15 *cilities to produce neutrino beams of sufficient inten-*
16 *sity to explore research priorities identified by the*
17 *High Energy Physics Advisory Panel or the National*
18 *Academy of Sciences.*

19 (c) *DARK ENERGY AND DARK MATTER RESEARCH.*—
20 As part of the program described in subsection (a), the Di-
21 rector shall carry out research activities on the nature of
22 dark energy and dark matter. These activities shall be con-
23 sistent with research priorities identified by the High En-
24 ergy Physics Advisory Panel or the National Academy of
25 Sciences, and may include—

1 (1) *the development of space-based and land-*
 2 *based facilities and experiments; and*

3 (2) *collaborations with the National Aeronautics*
 4 *and Space Administration, the National Science*
 5 *Foundation, or international collaborations on rel-*
 6 *evant research projects.*

7 (d) *ACCELERATOR RESEARCH AND DEVELOPMENT.—*
 8 *The Director shall carry out research and development in*
 9 *advanced accelerator concepts and technologies to reduce the*
 10 *necessary scope and cost for the next generation of particle*
 11 *accelerators.*

12 (e) *INTERNATIONAL COLLABORATION.—The Director,*
 13 *as practicable and in coordination with other appropriate*
 14 *Federal agencies as necessary, shall ensure the access of*
 15 *United States researchers to the most advanced accelerator*
 16 *facilities and research capabilities in the world, including*
 17 *the Large Hadron Collider.*

18 **SEC. 609. NUCLEAR PHYSICS PROGRAM.**

19 (a) *PROGRAM.—As part of the activities authorized*
 20 *under section 603, the Director shall carry out a research*
 21 *program, and support relevant facilities, to discover and*
 22 *understand various forms of nuclear matter.*

23 (b) *FACILITY CONSTRUCTION AND UPGRADES.—Con-*
 24 *sistent with the Office of Science's project management*
 25 *practices, the Director shall carry out—*

1 (1) *an upgrade of the Continuous Electron Beam*
2 *Accelerator Facility to a 12 gigaelectronvolt beam of*
3 *electrons; and*

4 (2) *construction of the Facility for Rare Isotope*
5 *Beams.*

6 (c) *ISOTOPE DEVELOPMENT AND PRODUCTION FOR*
7 *RESEARCH APPLICATIONS.—The Director shall carry out*
8 *a program for the production of isotopes, including the de-*
9 *velopment of techniques to produce isotopes, that the Sec-*
10 *retary determines are needed for research or other purposes.*
11 *In making this determination, the Secretary shall consider*
12 *any relevant recommendations made by Federal advisory*
13 *committees, the National Academies, and interagency work-*
14 *ing groups in which the Department participates.*

15 **SEC. 610. SCIENCE LABORATORIES INFRASTRUCTURE PRO-**
16 **GRAM.**

17 (a) *PROGRAM.—The Director shall carry out a pro-*
18 *gram to improve the safety, efficiency, and mission readi-*
19 *ness of infrastructure at Office of Science laboratories. The*
20 *program shall include projects to—*

21 (1) *renovate or replace space that does not meet*
22 *research needs;*

23 (2) *replace facilities that are no longer cost effec-*
24 *tive to renovate or operate;*

1 (3) *modernize utility systems to prevent failures*
2 *and ensure efficiency;*

3 (4) *remove excess facilities to allow safe and effi-*
4 *cient operations; and*

5 (5) *construct modern facilities to conduct ad-*
6 *vanced research in controlled environmental condi-*
7 *tions.*

8 (b) *MINOR CONSTRUCTION PROJECTS.—*

9 (1) *AUTHORITY.—Using operation and mainte-*
10 *nance funds or facilities and infrastructure funds au-*
11 *thorized by law, the Secretary may carry out minor*
12 *construction projects with respect to laboratories ad-*
13 *ministered by the Office of Science.*

14 (2) *ANNUAL REPORT.—The Secretary shall sub-*
15 *mit to Congress, as part of the annual budget submis-*
16 *sion of the Department, a report on each exercise of*
17 *the authority under subsection (a) during the pre-*
18 *ceding fiscal year. Each report shall include a sum-*
19 *mary of maintenance and infrastructure needs and*
20 *associated funding requirements at each of the labora-*
21 *tories, including the amount of both planned and de-*
22 *ferred infrastructure spending at each laboratory.*
23 *Each report shall provide a brief description of each*
24 *minor construction project covered by the report.*

1 (3) *COST VARIATION REPORTS.*—*If, at any time*
2 *during the construction of any minor construction*
3 *project, the estimated cost of the project is revised and*
4 *the revised cost of the project exceeds the minor con-*
5 *struction threshold, the Secretary shall immediately*
6 *submit to Congress a report explaining the reasons for*
7 *the cost variation.*

8 (4) *DEFINITIONS.*—*In this section—*

9 (A) *the term “minor construction project”*
10 *means any plant project not specifically author-*
11 *ized by law for which the approved total esti-*
12 *mated cost does not exceed the minor construc-*
13 *tion threshold; and*

14 (B) *the term “minor construction threshold”*
15 *means \$10,000,000, with such amount to be ad-*
16 *justed by the Secretary in accordance with the*
17 *Engineering News-Record Construction Cost*
18 *Index, or an appropriate alternative index as de-*
19 *termined by the Secretary, once every five years*
20 *after the date of enactment of this Act.*

21 (5) *NONAPPLICABILITY.*—*Sections 4703 and*
22 *4704 of the Atomic Energy Defense Act (50 U.S.C.*
23 *2743 and 2744) shall not apply to laboratories ad-*
24 *ministered by the Office of Science.*

1 **SEC. 611. AUTHORIZATION OF APPROPRIATIONS.**

2 *There are authorized to be appropriated to the Sec-*
3 *retary for the activities of the Office of Science—*

4 *(1) \$5,247,000,000 for fiscal year 2011, of*
5 *which—*

6 *(A) \$1,875,000,000 shall be for Basic En-*
7 *ergy Sciences activities under section 604;*

8 *(B) \$667,000,000 shall be for Biological and*
9 *Environmental Research activities under section*
10 *605; and*

11 *(C) \$466,000,000 shall be for Advanced Sci-*
12 *entific Computing Research activities under sec-*
13 *tion 606;*

14 *(2) \$5,614,000,000 for fiscal year 2012, of*
15 *which—*

16 *(A) \$2,025,000,000 shall be for Basic En-*
17 *ergy Sciences activities under section 604;*

18 *(B) \$720,000,000 shall be for Biological and*
19 *Environmental Research activities under section*
20 *605; and*

21 *(C) \$503,000,000 shall be for Advanced Sci-*
22 *entific Computing Research activities under sec-*
23 *tion 606;*

24 *(3) \$6,007,000,000 for fiscal year 2013, of*
25 *which—*

1 (A) \$2,187,000,000 shall be for Basic En-
2 ergy Sciences activities under section 604;

3 (B) \$778,000,000 shall be for Biological and
4 Environmental Research activities under section
5 605; and

6 (C) \$544,000,000 shall be for Advanced Sci-
7 entific Computing Research activities under sec-
8 tion 606;

9 (4) \$6,428,000,000 for fiscal year 2014, of
10 which—

11 (A) \$2,362,000,000 shall be for Basic En-
12 ergy Sciences activities under section 604;

13 (B) \$840,000,000 shall be for Biological and
14 Environmental Research activities under section
15 605; and

16 (C) \$587,000,000 shall be for Advanced Sci-
17 entific Computing Research activities under sec-
18 tion 606; and

19 (5) \$6,878,000,000 for fiscal year 2015, of
20 which—

21 (A) \$2,551,000,000 shall be for Basic En-
22 ergy Sciences activities under section 604;

23 (B) \$907,000,000 shall be for Biological and
24 Environmental Research activities under section
25 605; and

1 (C) \$634,000,000 shall be for Advanced Sci-
 2 entific Computing Research activities under sec-
 3 tion 606.

4 ***Subtitle B—Advanced Research***
 5 ***Projects Agency-Energy***

6 ***SEC. 621. SHORT TITLE.***

7 *This subtitle may be cited as the “ARPA-E Reauthor-*
 8 *ization Act of 2010”.*

9 ***SEC. 622. ARPA-E AMENDMENTS.***

10 *Section 5012 of the America COMPETES Act (42*
 11 *U.S.C. 16538) is amended—*

12 *(1) in subsection (c)(2)—*

13 *(A) in subparagraph (A), by inserting “and*
 14 *applied” after “advances in fundamental”;*

15 *(B) by striking “and” at the end of sub-*
 16 *paragraph (B);*

17 *(C) by striking the period at the end of sub-*
 18 *paragraph (C) and inserting “; and”; and*

19 *(D) by adding at the end the following new*
 20 *subparagraph:*

21 *“(D) promoting the commercial application*
 22 *of advanced energy technologies.”;*

23 *(2) in subsection (e)(3), by amending subpara-*
 24 *graph (C) to read as follows:*

1 “(C) research and development of advanced
2 manufacturing process and technologies for the
3 domestic manufacturing of novel energy tech-
4 nologies; and”;

5 (3) in subsection (e)—

6 (A) by striking “and” at the end of para-
7 graph (3)(D);

8 (B) by striking the period at the end of
9 paragraph (4) and inserting “; and”; and

10 (C) by adding at the end the following new
11 paragraph:

12 “(5) pursuant to subsection (c)(2)(C)—

13 “(A) ensuring that applications for funding
14 disclose the extent of current and prior efforts,
15 including monetary investments as appropriate,
16 in pursuit of the technology area for which fund-
17 ing is being requested;

18 “(B) adopting measures to ensure that, in
19 making awards, program managers adhere to the
20 objectives in subsection (c)(2)(C); and

21 “(C) providing as part of the annual report
22 required by subsection (h)(1) a summary of the
23 instances of and reasons for ARPA-E funding
24 projects in technology areas already being under-
25 taken by industry.”;

1 (4) by redesignating subsections (f) through (m)
2 as subsections (g), (h), (i), (j), (l), (m), (n), and (o),
3 respectively;

4 (5) by inserting after subsection (e) the following
5 new subsection:

6 “(f) AWARDS.—In carrying out this section, the Direc-
7 tor shall initiate and execute awards in the form of grants,
8 contracts, cooperative agreements, cash prizes, and other
9 transactions.”;

10 (6) in subsection (g), as so redesignated by para-
11 graph (4) of this section—

12 (A) by redesignating paragraphs (1) and
13 (2) as paragraphs (2) and (3), respectively;

14 (B) by inserting before paragraph (2), as so
15 redesignated by subparagraph (A) of this para-
16 graph, the following new paragraph:

17 “(1) IN GENERAL.—The Director shall establish
18 and maintain within ARPA-E a staff with sufficient
19 qualifications and expertise to enable ARPA-E to
20 carry out its responsibilities under this section in
21 conjunction with the operations of the rest of the De-
22 partment.”;

23 (C) in paragraph (2)(A), as so redesignated
24 by subparagraph (A) of this paragraph—

1 (i) in the paragraph heading, by strik-
2 ing “PROGRAM MANAGERS” and inserting
3 “PROGRAM DIRECTORS”;

4 (ii) by striking “program managers”
5 and inserting “program directors”; and

6 (iii) by striking “each of”.

7 (D) in paragraph (2)(B), as so redesignated
8 by subparagraph (A) of this paragraph—

9 (i) by striking “program manager”
10 and inserting “program director”;

11 (ii) in clause (iv), by striking “, with
12 advice under subsection (j) as appro-
13 priate,”;

14 (iii) by redesignating clauses (v) and
15 (vi) as clauses (vi) and (viii), respectively;

16 (iv) by inserting after clause (iv) the
17 following new clause:

18 “(v) identifying innovative cost-shar-
19 ing arrangements for ARPA-E projects, in-
20 cluding through use of the authority under
21 section 988(b)(3) of the Energy Policy Act
22 of 2005 (42 U.S.C. 16352(b)(3));”;

23 (v) in clause (vi), as so redesignated by
24 clause (iii) of this subparagraph, by strik-
25 ing “; and” and inserting a semicolon; and

1 (vi) by inserting after clause (vi), as so
 2 redesignated by clause (iii) of this subpara-
 3 graph, the following new clause:

4 “(vii) identifying mechanisms for com-
 5 mercial application of successful energy
 6 technology development projects, including
 7 through establishment of partnerships be-
 8 tween awardees and commercial entities;
 9 and”;

10 (E) in paragraph (2)(C), as so redesignated
 11 by subparagraph (A) of this paragraph, by in-
 12 serting “up to” after “shall be”;

13 (F) in paragraph (3), as so redesignated by
 14 subparagraph (A) of this paragraph, by striking
 15 subparagraph (B) and redesignating subpara-
 16 graphs (C) and (D) as subparagraphs (B) and
 17 (C), respectively; and

18 (G) by adding at the end the following new
 19 paragraph:

20 “(4) *FELLOWSHIPS.*—The Director is authorized
 21 to select exceptional early-career and senior scientific,
 22 legal, business, and technical personnel to serve as fel-
 23 lows to work at ARPA-E for terms not to exceed two
 24 years. Responsibilities of fellows may include—

1 “(A) supporting program managers in pro-
 2 gram creation, design, implementation, and
 3 management;

4 “(B) exploring technical fields for future
 5 ARPA-E program areas;

6 “(C) assisting the Director in the creation
 7 of the strategic vision for ARPA-E referred to in
 8 subsection (h)(2);

9 “(D) preparing energy technology and eco-
 10 nomic analyses; and

11 “(E) any other appropriate responsibilities
 12 identified by the Director.”;

13 (7) in subsection (h)(2), as so redesignated by
 14 paragraph (4) of this section—

15 (A) by striking “2008” and inserting
 16 “2010”; and

17 (B) by striking “2011” and inserting
 18 “2013”;

19 (8) by amending subsection (j), as so redesign-
 20 ated by paragraph (4) of this section, to read as fol-
 21 lows:

22 “(j) *FEDERAL DEMONSTRATION OF TECHNOLOGIES.*—
 23 *The Director shall seek opportunities to partner with pur-*
 24 *chasing and procurement programs of Federal agencies to*

1 *demonstrate energy technologies resulting from activities*
2 *funded through ARPA-E.”;*

3 *(9) by inserting after such subsection (j) the fol-*
4 *lowing new subsection:*

5 *“(k) EVENTS.—*

6 *“(1) The Director is authorized to convene, orga-*
7 *nize, and sponsor events that further the objectives of*
8 *ARPA-E, including events that assemble awardees,*
9 *the most promising applicants for ARPA-E funding,*
10 *and a broad range of ARPA-E stakeholders (which*
11 *may include members of relevant scientific research*
12 *and academic communities, government officials, fi-*
13 *nancial institutions, private investors, entrepreneurs,*
14 *and other private entities), for the purposes of—*

15 *“(A) demonstrating projects of ARPA-E*
16 *awardees;*

17 *“(B) demonstrating projects of finalists for*
18 *ARPA-E awards and other energy technology*
19 *projects;*

20 *“(C) facilitating discussion of the commer-*
21 *cial application of energy technologies developed*
22 *under ARPA-E and other government-sponsored*
23 *research and development programs; or*

24 *“(D) such other purposes as the Director*
25 *considers appropriate.*

1 “(2) *Funding for activities described in para-*
 2 *graph (1) shall be provided as part of the technology*
 3 *transfer and outreach activities authorized under sub-*
 4 *section (o)(4)(B).’”;*

5 *(10) in subsection (m)(1), as so redesignated by*
 6 *paragraph (4) of this section, by striking “4 years”*
 7 *and inserting “6 years”;*

8 *(11) in subsection (m)(2)(B), as so redesignated*
 9 *by paragraph (4) of this section, by inserting “, and*
 10 *how those lessons may apply to the operation of other*
 11 *programs within the Department of Energy” after*
 12 *“ARPA-E”;*

13 *(12) by amending subsection (o)(2), as so redes-*
 14 *ignated by paragraph (4) of this section, to read as*
 15 *follows:*

16 “(2) *AUTHORIZATION OF APPROPRIATIONS.—*
 17 *Subject to paragraph (4), there are authorized to be*
 18 *appropriated to the Director for deposit in the Fund,*
 19 *without fiscal year limitation—*

20 “(A) \$300,000,000 for fiscal year 2011;

21 “(B) \$450,000,000 for fiscal year 2012;

22 “(C) \$600,000,000 for fiscal year 2013;

23 “(D) \$800,000,000 for fiscal year 2014; and

24 “(E) \$1,000,000,000 for fiscal year 2015.”;

(13) in subsection (o), as so redesignated by paragraph (4) of this section, by—

(A) striking paragraph (4); and

(B) redesignating paragraph (5) as paragraph (4); and

(14) in subsection (o)(4)(B), as so redesignated by paragraphs (4) and (13)(B) of this subsection—

(A) by striking “2.5 percent” and inserting “5 percent”; and

(B) by inserting “, consistent with the goal described in subsection (c)(2)(D) and within the responsibilities of program directors as specified in subsection (g)(2)(B)(vii)” after “outreach activities”.

Subtitle C—Energy Innovation Hubs

SEC. 631. SHORT TITLE.

This subtitle may be cited as the “Energy Innovation Hubs Authorization Act of 2010”.

SEC. 632. ENERGY INNOVATION HUBS.

(a) *ESTABLISHMENT OF PROGRAM.*—

(1) *IN GENERAL.*—*The Secretary of Energy shall carry out a program to enhance the Nation’s economic, environmental, and energy security by making grants to consortia for establishing and operating En-*

1 *ergy Innovation Hubs to conduct and support, when-*
2 *ever practicable at one centralized location, multi-*
3 *disciplinary, collaborative research, development,*
4 *demonstration, and commercial application of ad-*
5 *vanced energy technologies in areas not being served*
6 *by the private sector.*

7 (2) *TECHNOLOGY DEVELOPMENT FOCUS.—The*
8 *Secretary shall designate for each Hub a unique ad-*
9 *vanced energy technology development focus.*

10 (3) *COORDINATION.—The Secretary shall ensure*
11 *the coordination of, and avoid unnecessary duplica-*
12 *tion of, the activities of Hubs with those of other De-*
13 *partment of Energy research entities, including the*
14 *National Laboratories, the Advanced Research*
15 *Projects Agency—Energy, and Energy Frontier Re-*
16 *search Centers, and within industry. Such coordina-*
17 *tion shall include convening and consulting with rep-*
18 *resentatives of staff of the Department of Energy, rep-*
19 *resentatives from Hubs and the qualifying entities*
20 *that are members of the consortia operating the Hubs,*
21 *and representatives of such other entities as the Sec-*
22 *retary considers appropriate, to share research re-*
23 *sults, program plans, and opportunities for collabora-*
24 *tion.*

1 (4) *ADMINISTRATION.*—*The Secretary shall ad-*
2 *minister this section with respect to each Hub through*
3 *the Department program office appropriate to admin-*
4 *ister the subject matter of the technology development*
5 *focus assigned under paragraph (2) for the Hub.*

6 (b) *CONSORTIA.*—

7 (1) *ELIGIBILITY.*—*To be eligible to receive a*
8 *grant under this section for the establishment and op-*
9 *eration of a Hub, a consortium shall—*

10 (A) *be composed of no fewer than 2 quali-*
11 *fying entities;*

12 (B) *operate subject to a binding agreement*
13 *entered into by its members that documents—*

14 (i) *the proposed partnership agree-*
15 *ment, including the governance and man-*
16 *agement structure of the Hub;*

17 (ii) *measures to enable cost-effective*
18 *implementation of the program under this*
19 *section;*

20 (iii) *a proposed budget, including fi-*
21 *nancial contributions from non-Federal*
22 *sources;*

23 (iv) *conflict of interest procedures con-*
24 *sistent with subsection (d)(3), all known*

1 *material conflicts of interest, and cor-*
 2 *responding mitigation plans;*

3 *(v) an accounting structure that en-*
 4 *ables the Secretary to ensure that the con-*
 5 *sortium has complied with the requirements*
 6 *of this section; and*

7 *(vi) an external advisory committee*
 8 *consistent with subsection (d)(2); and*

9 *(C) operate as a nonprofit organization.*

10 *(2) APPLICATION.—A consortium seeking to es-*
 11 *tablish and operate a Hub under this section, acting*
 12 *through a prime applicant, shall transmit to the Sec-*
 13 *retary an application at such time, in such form, and*
 14 *accompanied by such information as the Secretary*
 15 *shall require, including a detailed description of the*
 16 *elements of the consortium agreement required under*
 17 *paragraph (1)(B). If the consortium members will not*
 18 *be located at one centralized location, such applica-*
 19 *tion shall include a communications plan that en-*
 20 *sures close coordination and integration of the Hub's*
 21 *activities.*

22 *(c) SELECTION AND SCHEDULE.—The Secretary shall*
 23 *select consortia for grants for the establishment and oper-*
 24 *ation of Hubs through competitive selection processes.*
 25 *Grants made to a Hub shall be for a period not to exceed*

1 5 years, after which the grant may be renewed, subject to
2 a competitive selection process.

3 (d) *HUB OPERATIONS.*—

4 (1) *IN GENERAL.*—Hubs shall conduct or provide
5 for multidisciplinary, collaborative research, develop-
6 ment, demonstration, and commercial application of
7 advanced energy technologies within the technology
8 development focus designated for the Hub by the Sec-
9 retary under subsection (a)(2). Each Hub shall—

10 (A) encourage collaboration and commu-
11 nication among the member qualifying entities
12 of the consortium and awardees by conducting
13 activities whenever practicable at one centralized
14 location;

15 (B) develop and publish on the Department
16 of Energy's website proposed plans and pro-
17 grams;

18 (C) submit an annual report to the Sec-
19 retary summarizing the Hub's activities, includ-
20 ing detailing organizational expenditures, listing
21 external advisory committee members, and de-
22 scribing each project undertaken by the Hub;
23 and

24 (D) monitor project implementation and co-
25 ordination.

1 (2) *EXTERNAL ADVISORY COMMITTEE.*—*Each*
2 *Hub shall establish an external advisory committee,*
3 *the membership of which shall have sufficient exper-*
4 *tise to advise and provide guidance on scientific, tech-*
5 *nical, industry, financial, and research management*
6 *matters.*

7 (3) *CONFLICTS OF INTEREST.*—

8 (A) *PROCEDURES.*—*Hubs shall establish*
9 *conflict of interest procedures, consistent with*
10 *those of the Department of Energy, to ensure*
11 *that employees and consortia designees for Hub*
12 *activities who are in decisionmaking capacities*
13 *disclose all material conflicts of interest, includ-*
14 *ing financial, organizational, and personal con-*
15 *licts of interest.*

16 (B) *DISQUALIFICATION AND REVOCATION.*—
17 *The Secretary may disqualify an application or*
18 *revoke funds distributed to a Hub if the Sec-*
19 *retary discovers a failure to comply with conflict*
20 *of interest procedures established under subpara-*
21 *graph (A).*

22 (e) *PROHIBITION ON CONSTRUCTION.*—

23 (1) *IN GENERAL.*—*No funds provided pursuant*
24 *to this section may be used for construction of new*
25 *buildings or facilities for Hubs. Construction of new*

1 *buildings or facilities shall not be considered as part*
 2 *of the non-Federal share of a Hub cost-sharing agree-*
 3 *ment.*

4 (2) *TEST BED AND RENOVATION EXCEPTION.—*
 5 *Nothing in this subsection shall prohibit the use of*
 6 *funds provided pursuant to this section, or non-Fed-*
 7 *eral cost share funds, for the construction of a test bed*
 8 *or renovations to existing buildings or facilities for*
 9 *the purposes of research if the Oversight Board deter-*
 10 *mines that the test bed or renovations are limited to*
 11 *a scope and scale necessary for the research to be con-*
 12 *ducted.*

13 (f) *OVERSIGHT BOARD.—The Secretary shall establish*
 14 *and maintain within the Department an Oversight Board*
 15 *to oversee the progress of Hubs.*

16 (g) *PRIORITY CONSIDERATION.—The Secretary shall*
 17 *give priority consideration to applications in which 1 or*
 18 *more of the institutions under subsection (b)(1)(A) are 1890*
 19 *Land Grant Institutions (as defined in section 2 of the Ag-*
 20 *ricultural Research, Extension, and Education Reform Act*
 21 *of 1998 (7 U.S.C. 7061)), Predominantly Black Institutions*
 22 *(as defined in section 318 of the Higher Education Act of*
 23 *1965 (20 U.S.C. 1059e)), Tribal Colleges or Universities (as*
 24 *defined in section 316(b) of the Higher Education Act of*
 25 *1965 (20 U.S.C. 1059c(b)), or Hispanic Serving Institu-*

1 tions (as defined in section 318 of the Higher Education
2 Act of 1965 (20 U.S.C. 1059e)).

3 (h) *DEFINITIONS.*—For purposes of this section:

4 (1) *ADVANCED ENERGY TECHNOLOGY.*—The term
5 “advanced energy technology” means an innovative
6 technology—

7 (A) that produces energy from solar, wind,
8 geothermal, biomass, tidal, wave, ocean, or other
9 renewable energy resources;

10 (B) that produces nuclear energy;

11 (C) for carbon capture and sequestration;

12 (D) that enables advanced vehicles, vehicle
13 components, and related technologies that result
14 in significant energy savings;

15 (E) that generates, transmits, distributes,
16 utilizes, or stores energy more efficiently than
17 conventional technologies; or

18 (F) that enhances the energy independence
19 and security of the United States by enabling
20 improved or expanded supply and production of
21 domestic energy resources, including coal, oil,
22 and natural gas.

23 (2) *HUB.*—The term “Hub” means an Energy
24 Innovation Hub established in accordance with this
25 section.

1 (3) *INSTITUTION OF HIGHER EDUCATION.*—*The*
 2 *term “institution of higher education” has the mean-*
 3 *ing given that term in section 101(a) of the Higher*
 4 *Education Act of 1965 (20 U.S.C. 1001(a)).*

5 (4) *QUALIFYING ENTITY.*—*The term “qualifying*
 6 *entity” means—*

7 (A) *an institution of higher education;*

8 (B) *an appropriate State or Federal entity,*
 9 *including the Department of Energy Federally*
 10 *Funded Research and Development Centers;*

11 (C) *a nongovernmental organization with*
 12 *expertise in advanced energy technology research,*
 13 *development, demonstration, or commercial ap-*
 14 *plication; or*

15 (D) *any other relevant entity the Secretary*
 16 *considers appropriate.*

17 (5) *SECRETARY.*—*The term “Secretary” means*
 18 *the Secretary of Energy.*

19 (i) *AUTHORIZATION OF APPROPRIATIONS.*—*There are*
 20 *authorized to be appropriated to the Secretary to carry out*
 21 *this section—*

22 (1) *\$110,000,000 for fiscal year 2011;*

23 (2) *\$135,000,000 for fiscal year 2012;*

24 (3) *\$195,000,000 for fiscal year 2013;*

25 (4) *\$210,000,000 for fiscal year 2014; and*

(5) \$210,000,000 for fiscal year 2015.

***Subtitle D—Cooperative Research
and Development Fund***

SEC. 641. SHORT TITLE.

This subtitle may be cited as the “Cooperative Research and Development Fund Authorization Act of 2010”.

***SEC. 642. COOPERATIVE RESEARCH AND DEVELOPMENT
FUND.***

(a) IN GENERAL.—The Secretary of Energy shall make funds available to Department of Energy National Laboratories for the Federal share of cooperative research and development agreements. The Secretary of Energy shall determine the apportionment of such funds to each Department of Energy National Laboratory and shall ensure that special consideration is given to small business firms and consortia involving small business firms in the selection process for which cooperative research and development agreements will receive such funds.

(b) REPORTING.—Each year the Secretary shall submit to Congress a report that describes how funds were expended under this subtitle.

(c) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Secretary such sums as are necessary to carry out this section each fiscal year.

1 *No funds allocated for this section shall come from funds*
2 *allocated for the Office of Science.*

3 ***TITLE VII—MISCELLANEOUS***

4 ***SEC. 701. SENSE OF CONGRESS.***

5 *It is the sense of Congress that, among the programs*
6 *and activities authorized in this Act, those that correspond*
7 *to the recommendations of the National Academy of*
8 *Sciences’ 2005 report entitled “Rising Above the Gathering*
9 *Storm” remain critical to maintaining long-term United*
10 *States economic competitiveness, and accordingly shall re-*
11 *ceive funding priority.*

12 ***SEC. 702. PERSONS WITH DISABILITIES.***

13 *For the purposes of the activities and programs sup-*
14 *ported by this Act and the amendments made by this Act,*
15 *institutions of higher education chartered to serve large*
16 *numbers of students with disabilities, including Gallaudet*
17 *University, Landmark College, and the National Technical*
18 *Institute for the Deaf and those with programs serving or*
19 *those serving disabled veterans, shall receive special consid-*
20 *eration and have a designation consistent with the designa-*
21 *tion for other institutions that serve populations underrep-*
22 *resented in STEM to ensure that institutions of higher edu-*
23 *cation chartered to or serving persons with disabilities ben-*
24 *efit from such activities and programs.*

1 **SEC. 703. VETERANS AND SERVICE MEMBERS.**

2 *In awarding scholarships and fellowships under this*
3 *Act, an institution of higher education shall give preference*
4 *to applications from veterans and service members, includ-*
5 *ing those who have received or will receive the Afghanistan*
6 *Campaign Medal or the Iraq Campaign Medal as author-*
7 *ized by Public Law 108–234 (10 U.S.C. 1121 note; 118*
8 *Stat. 655) and Executive Order No. 13363.*

Union Calendar No. 271

11TH CONGRESS
2^D Session

H. R. 5116

[Report No. 111-478, Part I]

A BILL

To invest in innovation through research and development, to improve the competitiveness of the United States, and for other purposes.

MAY 7, 2010

Reported from the Committee on Science and Technology
with an amendment

MAY 7, 2010

Committee on Education and Labor discharged; committed to the Committee of the Whole House on the State of the Union and ordered to be printed